CONFERENCE PROCEEDINGS

3rd INTERNATIONAL ACADEMIC CONFERENCE ON PLACES AND TECHNOLOGIES

EDITORS
EVA VANIŠTA LAZAREVIĆ
MILENA VUJKIROVIĆ
ALEKSANDRA KRSTIĆ-FURUNDŽIĆ
AND ALEKSANDRA ĐUKIĆ
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3rd International Academic Conference on Places and Technologies

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EVA VANIŠTA LAZAREVIĆ
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PLACES AND TECHNOLOGIES 2016
CONFERENCE PROCEEDINGS OF THE 3RD INTERNATIONAL ACADEMIC CONFERENCE ON PLACES AND TECHNOLOGIES

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BY HIGHLIGHTING ITS SAFETY, SUSTAINABILITY, EFFICIENCY,
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COGNITIVE PERFORMANCES OF PEDESTRIAN SPACES

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ABSTRACT

If the city and its physical structure are understood as some kind of an extended, external memory of the human mind, two aspects are observable. The first relates to the characteristics of the city and its places to help in the orientation and way finding of its citizens and visitors. They could be explored through mental or cognitive maps. The second aspect includes the elements involved in generating the image and identity of the city. Looking at the pedestrian space as an environment that achieves the most intimate relationship of users and the city, the paper would present the elements that can be seen as cognitive performances of pedestrian spaces. They will be analysed at the area of the City of Belgrade, central pedestrian network with the aim to identify existing and to propose future of the proposals elements that will contribute to its extension and intensive use.

Keywords: pedestrian spaces, communication, cognitive performances, City of Belgrade

INTRODUCTION

By observing the communication from the aspect of culture, every cultural phenomenon could be seen from the communicational perspective, i.e. as model or way of communication (Tomić 2003, 12). This is also the case with a pedestrian space. In contrast to the non-verbal communication, pedestrian space has cognitive dimension that is not based solely on interaction. In regards with this, it was noticed that people their physical environment associate with connotations that are more frequent subject of research.

According to IRN3, cognitive system in general and the one associated with cognitive maps extends beyond the individual mind in the external environment. This could be explained by the fact that the cognitive system is a network made up of internal and external representations. Internal representations are related to entities, constructed in the human mind, which represent the information (visual, olfactory, language, etc.) from the external environment. On the other hand, external representations refer to entities created on the basis of human mimetic, linguistic and manufacture capabilities that represent the information generated in the mind. They are

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1 Corresponding author
2Landscape, cities of other geographical phenomena
3Inter-Representational Network (IRN)
products of human abilities to represent the ideas, emotions and thoughts externally and can be divided on body and artificial representations. In contrast to body representations, which cannot extend outside the body, the artificial ones expand outside the human body and become independent artefacts (objects).

By observing the pedestrian space on presented way, the model of synergetic inter-representative network - SIRN (Portugali 2011, 142) 1) establish the relations on the basis of official selforganising mediator that is a subject of the operation of two streams of information (internal and external) and 2) explains the ways in which performances are entered into the external world (the city) and the ways people understand them (as intermediaries). In accordance with that, the result of the SIRN is two fields of information – internal and external. Each of these fields is accessible and legible to its creator. However, the field of the external information is also accessible and legible to other people. Thus, the interaction of internal and external information is called a common reservoir and can take forms like text, Internet, objects or entire cities. Therefore, the city users with their activities and behaviour define the city4.

This paper covers three parts. The first part is dealing with the general presentation of the communication of urban environment with the focus on its cognitive dimension. In the second part the specificity and physical characteristics of the pedestrian space network, as a communicational instrument will be presented. And in the third, the case study of pedestrian network in Belgrade central area will be used as an illustration of the presented findings.

COMMUNICATION OF THE PEDESTRIAN ENVIRONMENT

Walking is the most intimate with the environment and allows much more articulate processes of interpretation and memory (Madanipour 1996, 64-65). Observing the architecture and urban design as a visual art, Cullen (1971, 194) is focusing on personal and emotional reactions of the urban environment, because they are “captured” by sense of sight. He was presented the series of visual techniques that was used to show the walk through the environment by capturing current and future views of the observer during the motion. These findings are supplemented by the understanding of the position of the body in the environment, its awareness of the space and the mood and the character of the individual. However, the disadvantage of this approach is seen in the fact that the urban environment is exercised the stimulus other senses, especially if one takes into account pedestrian movement.

In order to form a humane approach to urban form, theorists have been searched for an image of the city and its legibility. The technique that was used in the study of ways that people remember

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4 In the language of synergetic this process is called circular causality, while in social theory, the same term is known as socio-spatial reproduction and structuring (Portugali 2011, 164)
the environment is mental mapping, i.e. detection of mental images created by the individuals when uses the city (Madanipour 1996, 66). Interested in the visual quality of American cities represented in the mental maps of its citizens, Lynch (1979) has distinguished five elements of the image of a city: paths, edges, nodes, landmarks and districts. It was noted that the cities in which the five elements are clearly observed offer much more than a visual pleasure, but emotional security, because they increase the depth and intensity of human experience.

Golledge (1978) has concluded that people first remember locations with landmarks, then come the links between locations and at the end areas as a surrounding of the locations. This resulted in the determination of three or four elements that affect the level of legibility of the city: points, lines, areas and surfaces. Accordingly, the knowledge of the environment acquired during the physical movement cover recording parts of the network structure (planned or strip-folders) and cognitive processing and storage of knowledge gained from observations made during the movement and path finding. Other studies suggest that people, instead of the subtle factors of design, are also interested in what is happening in a certain area. Thus the importance is given to the specific use of a certain area.

Potugali (2011, 199) noticed that the face of the city os formed by elements – external representations – that have the ability to encompass and transfer the information – Shannon and semantic. Shannon information has the information capacity of the communication channel, regardless of the quality or meaning of information. On the other sode, semantic information refers to the meaning that is transmitted throu gh representation of the experience specific receiver. Thus, in addition Lynch’s five elements, there are also other buildings, streets, parks, etc. The difference between them is reflected in the quantity of information they contain, and are thus more or less important for the legibility of the city. Accordingly the face of the city is the message that transmits different level of Shannon’s information which depends on semantic information. And, that is how people cognitively and actively give the meaning to the elements from which the city is made, as well as the city as whole.

By detailed research of the face of the city, another way of analysing the semantic information is established. This is the observation of urban artefacts as unique and redundant (see table 1). Unique artefacts are elements in the environment that carry high value Shannon's information, and because of that it are easy to remember them. As a result, unique artefacts are much more intensively involved in shaping the face of the city. However, among them, it could be made a difference in relation to the character of the semantic information that defines the source of the uniqueness of particular element. Based on that, they are divided into geometric, symbolic and legendary unique artefacts. Redundant artefacts include those items which, due to their multiplicities and repetition, form categories with different characteristics. A convenient way to make a difference among them is the establishment of a category in relation to the scale. Thus four subtypes are distinguished and they include urban furniture, buildings, urban scenes and street network.

<table>
<thead>
<tr>
<th>Table 1: Urban artefacts: Unique vs. Redundant (Portugali 2011)</th>
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</thead>
<tbody>
<tr>
<td><strong>UNIQUE ARTEFACTS</strong></td>
</tr>
<tr>
<td>Geometric uniqueness</td>
</tr>
<tr>
<td>Symbolic uniqueness</td>
</tr>
<tr>
<td>Legendary uniqueness</td>
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<tr>
<td>Urban furniture</td>
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<tr>
<td>Buildings</td>
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<tr>
<td>Urban scenes</td>
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<tr>
<td>Street network</td>
</tr>
<tr>
<td><strong>REDUNDANT ARTEFACTS</strong></td>
</tr>
</tbody>
</table>

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By observing the city in general, its face is not determined only by buildings, but also by the streets, rivers, waterfronts, squares, etc (Vukmirovic 2014). Given the above, similar approach that determines the quantity of information carried by the object can be used for the streets. In contrast to buildings, for the street it can be observer the geometry of the street network, the dominant content and distribution of open public spaces.

SPECIFICS AND PHYSICAL CHARACTERISTICS OF PEDESTRIAN NETWORK

As mentioned above, the analysis of the cognitive maps of the cities has shown a series of elements that could represent key physical characteristics of a particular area. The reason for this is seen in the ways in which an individual acquires knowledge of a particular city, or the amount of information that is carried by the elements of the urban area (Portugali 2011). The researches in the field of memory and categorization have shown that people employ a different type of memory considering the circumstances and cognitive tasks. Thus, the short-term cognitive maps are engaged when somebody asks another one to explain how to get from one place to another. Autobiographical cognitive maps are called to describe the place where we grew up or the neighbourhood, while C-maps are used when people find themselves in the city where they never were before.

The difference between the ways in which citizens and new residents formed their own mental maps of the area, can be seen in the examples of autobiographical cognitive maps. While researching that kind of memories, it was thought that autobiographical cities are dynamic entities that changeover time and that are sensitive to signals that generate them. Thus, the mental map on which is presented the place where the respondent lived is richer than the map of the new place of residence. Landmarks and districts dominate the first maps, while paths dominate the second.

Figure 2: Place where the respondent has lived (left) and the new place of residence (right) (Portugali 2011, 126).

Considering the ways of constructing cognitive maps, the formation of the network of pedestrian spaces could be analysed on the basis of its simplified structure, which includes identification of paths/connections and destinations/nodes. This approach was used in Spatial Metro Project that has the objective to improve the centre of the city for pedestrians (van der Spek 2007).

5Paths, edges, nodes, landmarks and districts (Lynch 1960); points, lines, areas and surfaces (Gollege 1990); centres and corridors (Ellin 2006); connections and destinations, etc.
Destinations are the places with the greatest intensity of users and correspond to the places that are located at the corners of the streets, main public spaces or dotted along the paths. On the other side, connections, function as water canals and correspond to the streets in which the most of the movement takes place.

Connections and destination are analysed in relation to the spatial coverage determined by the value of acceptable length/duration of walking. It is determined by unit of time (15 minutes) or the unit of length (up to 1,000m). Thus reasonable walking length determine the walking area, which corresponds to a square mile, or 1km2 and in relation to walking we are interested in places that generate the highest level of life in open public spaces. Thus, the most successful urban areas could be analysed on different scales, but their common characteristics are that they could be reached in 10 minutes walk and that they have a large number of intersections (Montgomery 1998). The most successful urban areas cover an area of about1km2 and have about 250 intersections, sometimes much more (Jacobs 1995).

On the other side, the experience of the city as well as pedestrian space corresponds to the area covered by the frame of sight of pedestrians, which has its optimum width, height and depth. Pedestrian frame of sight could be also characterised as its sensory field, because this space is rich of stimuli that acts on other senses, through which it is possible to achieve a significant effect on the formation of experience. The sight, determined by pedestrian field of view provides an overview of the existence of landmarks that are associated with the beginning and end paths intense interaction with the environment in the immediate vicinity. Thus the face of the city that is displayed to pedestrian covers also unique and redundant urban artefacts.

Considering the elements of cognitive maps that show the key elements of the physical structure of the city, as well as the character of the unique and redundant urban artefacts, cognitive performances of the pedestrian network will be analysed on the city level on the case study of pedestrian network of the City of Belgrade central area.

**CASE STUDY BELGRADE**

The pedestrian network in the Belgrade city centre covers the area of 0.79m2 that is 0.22% of the total surface of the city. On that polygon it was identified 13.718m of vehicle routes and 2.781m of paths that are pedestrian only. Considering the mentioned lengths of the paths and by comparing the relation between them, there is a conclusion that the ration of 5:1 in favour of vehicle routes.

![Figure 3: The pedestrian network in Belgrade city centre _ a) Paths and intersections and b) Attractors. Source: Vukmirovic](image-url)

6Amsterdam 600, Toulouse 330, Mayfair in London 420, etc.
The network is formed of 40 vehicular and 19 pedestrian paths whose traverse creates 112 intersections (see Figure 3a). Compared with the optimal number of intersection of 250, it is concluded that there are 138 intersections less than necessary.

By an examination of the strip-map of Belgrade (see Figure 4) it was found that the area covered by the imaginary circle of 500m in radius includes 27 attractors, distinct to the space of 1000m in radius where 71 attractors are mapped (see Figure 3b). Besides the objects that have been noted as unique artefacts (geographic, symbolic or legendary), there are buildings that are protected cultural monuments. The buildings of great importance for the Republic of Serbia at the research polygon are Belgrade’s Fortress, Dositej’s Lyceum (Dositejev licej), Captain Misa’s Mansion (Kapetan Misoño zdanje), Princess Ljubica’s Residence (Konak knežije Ljubice) and the Congregational Church (Saborna crkva) (Универзитет у Београду, Шумарски факултет и Институт за архитектуру и урбанизам Србије 2012, 21). In addition, there are also allocated a dozen of monuments of big importance and dozens of cultural monuments.

Belgrade tourist map presented at the Trip advisor’s web portal shows 67 localities that have been identified as Belgrade’s attractions allocated by the visitors. The most selected of all the mentioned attractions is Belgrade’s Fortress (see Figure 5). Other locations that visitors have been singled out are Republic Square, followed by Skadarlija (3), Church of St. Petka (4), Knez Mihailova Street (6), National Theatre (8), the Danube (11), Belgrade Zoo (14) Congregational Church (17), the Church of the Holy Mother of God (18) Doročol (20) and Princess Ljubica Residence (24).

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1 Bajrakli džamija, Jevrem Grujić’s home, Narodna banka, National museum, Moskva hotel, National theatre, etc.
2 Agrar bank, Balkan cinema, Ćukur česma, Mika Alas’s home, Ethnographic museum, Ruski car cafe, Iguman’s palace, Cafe ?, etc.
Diagram created by Eric Fischer shows which parts of the wider area of Belgrade are the most visited by tourists. It clearly shows the path of Knez Mihailova Street, Terazije and Republic Square, the area around the Princess Ljubica’s Residence and the Congregational Church and the path of Paris streets with the upper part of the Belgrade Fortress (see Figure 6). In addition to the isolated location, the movement takes place in the wider area of the mentioned places and extends towards the Danube and the Sava waterfronts and along the Boulevard of King Alexander.

Figure 6: Belgrade _ Locals vs. Tourists. Source: Eric Fisher

The results of the analysis (see Figure 7) of the research area have shown that there is no unique content that dominates the location, i.e. defines the character it. They also have shown that within the selected network of pedestrian spaces the most frequent are cafes (30 in the radius of 500 m or 47 within a radius of 1,000m), on the second place are restaurants (13 in a radius of 500m, or 23 in a radius of 1,000m) and the third are banks (a total of 15 banks within a radius of 1,000m). Cinemas and major retails are the least present at the location.

Figure 7: Contents present at the research location. Source: Vukmirovic

During the year, 40 public events are happening at the location covered by the network of pedestrian spaces in the city centre (Vukmirovic 2013). Considering the period when they occur at the monthly basis (see Figure 8), the largest number of the events is held in April and October. On the other side, the lowest number of the events took place during the February (1), January, July, August, September and November (2).
In accordance to their thematic category, the most of the events belongs to the category of art and design (16) followed by the category of music and dancing (6). The most of them has decades long tradition like Belgrade Summer Festival (BELEF), International gathering of the children from Europe, Belgrade Music Festival (BEMUS), October salon, The May Exhibition, Belgrade Jazz Festival, etc. In addition to the mentioned events in the field of culture, the past few years has triggered by the developments of design events such as Belgrade Design Week festival Mikser, Resonate festival, etc. By keeping regular the occurrence Belgrade Fashion Week aims to present the Belgrade fashion scene - young less-known authors and those who have already positioned on the local fashion scene.

In addition to the mentioned, Belgrade is also known by the events organised in the form of political protests (demonstrations, engaged performances, carnival celebrations, etc.) that have occasionally occurred in late XX and early XXI century. Because of that, the city is represented as the capital of historical initiatives in terms of organised mass protests and strong civic passions of social action. The most common gathering for political purposes happened at Republic Square and Plateau in front of the Faculty of Philosophy in Belgrade.

CONCLUSIONS

On the basis of the presented results it could be defined general recommendation that need to be implemented in order to improve the quality of the network of pedestrian spaces in the Belgrade central area with the special attention paid on the cognitive performances of the pedestrian space seen form the city level. This need to be done simultaneously, in the domain of physical as well as in the functional domain, because they both participate in the creation of the pedestrian experience.

Having in mind the complex character of cognitive maps that include the most important elements of the physical as well as functional character of the city understood as unique and redundant artefacts the recommendations for the network of pedestrian spaces in the city of Belgrade include:

- The correction of the ration between pedestrian and vehicle paths in favour of pedestrian routes
- Increasing the number and balanced distribution of urban attractors
- Stimulation of the appearance of contents that increase the attractiveness and usage period of pedestrian/public space
- Gradual expansion of pedestrian routes and the intensity of everyday movement in pedestrian area.
- Establishing balanced relations between events that aim to generate a collective and cultural identity with events that represent the city.

REFERENCES
University of Belgrade – Faculty of Forestry and Institute of Architecture and Urbanism of Serbia, *Strategy of Sustainable development of Municipality of Stari Grad*, Belgrade: Municipality of Stari Grad, 2012 (In Serbian)
Vukmirovic, Milena. *Importance and role of network of pedestrian spaces in generating the competitive identity of the city*, Doctoral thesis, Belgrade: University of Belgrade – Faculty of Architecture, 2013 (In Serbian: Znacaj i uloga mreže pesakih prostora u generisanju kompetitivnog identiteta grada)