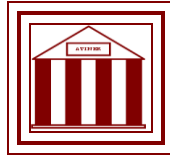


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**The Significance of Green Open  
Areas for the Quality of Life**

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## **The Significance of Green Open Areas for the Quality of Life**

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### **Abstract**

This paper presents the issues of residential areas dating from the time of political and economic changes in the early nineties, and the transition to a market economy in Ljubljana, Slovenia. This research aims to perform an evaluation of urban green areas from the aspect of users, its main focus being the new urban residential developments. Compared to the older neighbourhoods, the newer ones are typically single-use residential, while their open spaces are reduced in size and programme. The lack of appropriate accessible open green areas results in spending the majority of time indoors. The indoor air is known to be polluted with several chemicals, nano-particles, microorganisms, electro smog, etc. Spending time indoors should therefore be balanced with the time spent outside. So we are faced with two contradictory facts: the importance of outdoor activities on one side and the new urban planning concepts that enforce urban regeneration which focuses on densification and reuse. Key research problem deals with the quality of life in these areas, measured especially in the context of needs of the most vulnerable users, mainly the elderly and children. Both depend on well accessible green areas in near proximity to their homes. This paper explores how the residents experience the new spatial organisation of their living environment, and how

the poor quality open spaces may affect their health, more specifically the behavioural patterns, which reduce or strengthen personal health.

**Keywords:**

**Corresponding Author:**

### **Theoretic background and research framework**

Ljubljana, the Slovenian capital is a city of 270.000 inhabitants, where nature and urban tissue are interwoven. Despite the close connection with its natural background, the significance of green areas within the city itself for life quality remains and even increases with time. The main question of the research addresses the issue of children and elderly living in residential areas, who are directly dependent of the proximity of green open areas (Simoneti et al., 2008. Thompson, 2007). From the aspect of most vulnerable users, local green areas cannot be substituted by green areas in other parts of the city.

With the changes of historical periods of urbanism, the concept of residential housing has changed, and the one we use today differs from its original form. Therefore this paper separates the concept of residential estates in their true, original form as developed from 1960 - 1980, from the recently established concept of a new housing complex. The key difference between residential housing estates and new housing complexes is in their programme: according to recent research, the new collective residential developments neglect their communal open spaces, which should complement the built up structures in the form of green areas. The open areas designs vary between the emptiness of vast paved surfaces and decorative design; while the physical, social and psychological needs, which the users normally meet in the open spaces, are considered as subordinate to fulfilling the need for a new apartment (Simoneti et al., 2006). A comparison with some older residential estates in Ljubljana clearly shows that the older green open areas were significantly better planned. In that period, the concept of a residential estate was clearly structured, and primarily socially oriented. Planners were not faced by the market economy pressure and spatial limitations in planning large-scale projects (Gazvoda, 2006). In this manner, the original concept of residential estates was conceived around the idea of building communities, including all accompanying services such as childcare facilities, schools, community centres, shops, communal playgrounds and sports facilities, and also vast open green areas for relaxation and recreation; which is reasonable because of the fact, that the first residential estates were planned to house up to 5000 residents (Mihelič, 1983). Approximately half of the population of Ljubljana now resides in housing estates built in that period of time (Rebernik, 2002).

Apartment block developments provide accommodation for a dense population in cities. According to the World Health Organisation, two thirds of the World's population live in urban areas (Zaletel-Kragelj et al., 2007. World Health Organization, 2012). Along with the changed way of life which constrains people indoors most of their time, an increasing number of recent epidemiological health research studies focus on how indoor pollutants affect human health. Sources of indoor air pollution are external air, materials and furnishing, as well as people and their activities. Especially modern materials used in contemporary buildings cause the majority of health risks (Philomena, 2010). The symptoms related to staying indoors are headache, dizziness, sore



eyes, difficulties with breathing, etc, identified by the World Health Organisation as the 'Sick Building Syndrome'.

The syndrome is clinically difficult to diagnose and includes the body's reaction to a momentary discomfort, while the symptoms disappear relatively soon after leaving the room (WHO, 2012. Zaletel-Krajgelj in sod., 2007). The modern way of life, which does not leave much time to spend outdoors and does not provide appropriate open areas to fulfil one's needs of the outdoors, can be a health hazard in the long term time scale, and can lead to chronic diseases. Non-contagious chronic diseases are the key healthcare burden in Slovenia as well as in other developed societies and present an immense negative effect on a country's social and economic development (Zdravje... 2012).

On one hand there is therefore the fact that human urban health requires spending time outdoors, while on the other hand the contemporary professional paradigms of spatial planning dictate urban regeneration, densification and internal development (Strategija..., 2004). The aim of the investors to maximise the amount of profitable, therefore built-up areas, may cause these paradigms to be interpreted in a way that reduces the size and the quality of open green areas to the minimum, or even eliminates them altogether. Professionals working in the field of residential housing in Slovenia (Stanovanjske..., 2006) argue that appropriate open areas are mostly missing from new collective residential developments. High density development, achieved at the cost of open space must be questioned, and the profits should be balanced by related health costs, which can rise in low quality living environment. The main reason that these cost are not adequately considered is that it is much easier to calculate the profits from a newly built development in the near future than it is to assess the long term health risks of living in high density areas. When high density residential areas are connected with some other causative factors such as, e.g. social housing estates, there is a possibility of generating other determinants that cause an unhealthy lifestyle, e.g. the profile of low education population, economically disadvantaged residents, etc. (Dimitrovska Andrews, 2012. Zdravje..., 2012).

The interdisciplinary approach of the research regarding the significance of urban green space for the health of urban population in the case of residential estates in Ljubljana, combines the field of planning with public health science. Hygiene, as part of public health, is the foundation of urbanism. For the purpose of the study, the issue of public health is focussed on lifestyles and how they relate to general health. It is assumed that poor quality of urban furniture and the lack of open green areas lead to limited forms of spatial uses and consequently to a less healthy lifestyle, while residential areas with larger open areas which offer a wider range of activities result in a more diverse spatial use, and therefore encourage a healthier lifestyle. Since it is not possible to discuss any health implications directly caused by the lack of access to open and green areas (Zaletel-Kragelj in sod., 2007), we use the behavioural style of residents as an indicator of health risks within the framework of public health. The research part of the study therefore explores the connections between open

space quality and the behavioural patterns of residents, related to spending time outdoors. The study addresses the scope of open areas and the ways in which they are used, and last but not least, the feedback of local residents and their personal opinions are explored in more detail.

### **Research methodology regarding the quality of open spaces in residential areas**

At the beginning of the study, eight residential areas in Ljubljana were selected; four of which are more recent developments (*Nova Grbina*, *Viška Sončava*, *Celovski Dvori* and *Mesarska*), and the other four belong to the older generation of residential estates (*VS4 – Bonifacija*, *BS3 – Bežigrad*, *ŠS6 – Šiška* and *Trnovska Soseska VSI*). The research is limited to residential areas in Ljubljana in order to achieve a homogeneous context of macro-locational parameters. The residents of Ljubljana have the access to similar services and to large green open areas of the same quality. The selected residential estates and housing complexes were described and evaluated according to three different aspects of urban development (spatial, demographical and socio-economic), as all three groups of criteria are closely related to lifestyles, which can be beneficial or harming to general health. The spatial group includes the physical characteristics of the residential area, the availability of services and facilities, the open green areas and their accessibility. The demographic criteria include the age structure of the residents, while the socio-economic criteria are the employment status and the level of education. Each criterion was allocated a set of indicators, evaluated individually for each residential area. The obtained descriptions of residential areas were used for the selection of areas for further study. Since the focus of the research is in evaluating new housing complexes we included all four into the further study. *Viška soseska 4*, *Bonifacija* was assessed as the most appropriate example from the group of older residential estates, since it is most comparable in size, population and type of buildings. It was therefore included in further study as a comparison.

The second step of the research involved the method of observations and behavioural mapping. It is one of the most commonly used methods of studying urban public open spaces. Behavioural map is the final product of recording behaviour in space, and environmental psychology defines several types of behavioural maps; they can be behavioural matrices or maps in the true sense of the word. Spatial behaviour is normally observed within a limited time interval, so the results represent a segment of the actual life of a certain place (Goličnik et al., 2010. Goličnik, 2006. Šorn, 2005). The observed activities were selected according to two criteria: what can happen in this place (related to the size of the observed area and the available equipment allowing different uses), and what is the behavioural lifestyle of the residents (related to the public health science). For the purpose of this research, both behavioural matrices and maps were used; the first ones serve as a quantitative description tool of individual activities, while the latter show the correlation between

spatial structure and its uses. Before the beginning of fieldwork research, a coding system was defined; that is a set of symbols, used to record a specific activity. A schedule was set with three time periods of the day (from 10am to 12noon, from 1pm to 3pm, and from 5pm to 7pm). Prior to the fieldwork, the selected residential areas were divided into subareas, defined as observation units, which can be monitored within one sight of the observer. Every subarea was then observed ten minutes within each time period. Ten days of observations were performed within three weeks in September 2012; including weekends. All shortlisted residential areas were observed at the same time, so the results show a comparative section of time and space.

The field work observations were followed by data transfer into a digital Geographical Information System (GIS), including the crucial action of database formation, which served as the key data analysis tool. The database was used to rank classified parameter categories into classes, which allowed further data manipulation, comparison between cases and graphically presenting the observed activities according to chosen categories. Every data input of an observed activity of one single person is described with parameters within the following categories: sex, activity, type of activity, category of activity, age, duration, time of day, part of the week, temperature, wind, air humidity, clear or overcast sky, and date. 'Activity' is a descriptive category, which explains the action in more detail, while the 'Type of Activity' assigns the detailed description to the nearest class, e.g. walking, playing, child care, spending time outdoors, etc. The 'Category of Activity' ranks all different activities observed during the field research, into one of four classes on an even more abstract level: 'passive in space', 'active in transit', 'active in space', 'momentarily passive, otherwise in transit'. The category 'Duration' labels only the activities in space, which are not transitory, and the 'Time of Day' relates to one of the three daily time periods of observations. The remaining listed categories offer an insight into the current external conditions during the time of observations, which might affect the results of recorded activities and the overall use of the space.

## **Results and discussion**

The numerical description of selected residential areas shows that the new residential complexes are much smaller in size even compared to *Bonifacija*, which is the smallest of the four older residential estates. The latter includes a local shop, district community meeting facilities and a nursery within its vast open area, as a part of the fundamental residential estate services. As predicted from the size of the estate, *Bonifacija* also has the highest number of inhabitants (1613); however a similar number of residents could be living in *Mesarska* complex, if all the apartments were occupied, resulting in a much higher density. Building heights were used to calculate the Floor Space Index (FSI) of the site. *Bonifacija* has an even smaller FSI (0,68) than the recommended FSI value for a four-floor (plus ground floor) building, which is

1,04 (Pogačnik, 1999). More important than general standards of the plot ratio, are the so called 'Spatial Implementation Conditions', defined in municipal land use plans, which differ according to the plot's characteristics and its location. Today the 'Spatial Implementation Conditions' normally allow a higher FSI than the recommended values. All FSI's of residential areas are higher than recommended for their heights; the most extreme deviation being the case of FSI 2,79 of *Celovški Dvori*, while the recommended factor of nine floor (plus ground floor) buildings is 1,125 (Pogačnik, 1999).

The number of residents also shows the intensity of demand for using communal playgrounds, sports facilities and open green areas. The surface areas of children playgrounds are inadequate in all studied cases. More eloquent aspect of the surface area indicator is the square metres surface per inhabitant ratio. 0,7 square metres of playground area per resident in *Mesarska* complex is a very low ratio considering that 30% of the population living in the area are children (SURS, 2011). Comparison also shows a very low surface area of playgrounds per resident in the case of *Celovški Dvori*, however they do offer communal sports facilities, unlike any other studied case. *Bonifacija* estate shows the largest areas of playgrounds and sports facilities, which are also of the highest quality from the aspect of landscape elements (large trees, bushes, a lawn, a hill), which is not evident from the quantitative data. Playgrounds with no landscape elements can be found in *Viška Sončava*, and *Nova Grbina* includes four identical playgrounds for the youngest children, which may be redundant considering the statistical data about population – only 12,7% of residents are children from the youngest age group (SURS, 2011). In addition, all new playgrounds show poor or nonexistent sun shelter solutions, which is a result of planning green areas on the roofs of underground car parks. The thickness of the soil layer in such green roof constructions does not support trees and designing park features within new residential complexes (Gazvoda, 2001).

The total surface area of open spaces alone is not a complete information; therefore the amount of functional and passive areas was extracted from the original data. Functional areas do not include the private plots, car park and streets; while the passive areas show private use. Equally accessible to all residents, the functional green areas are the ones that are thought to contribute to a higher quality of life. In the case of *Mesarska* residential complex, the number 14.849,14 m<sup>2</sup> of functional green areas does not tell us much in itself, even though it is the highest compared to other new developments included in the study. The mentioned residential area consists of the lines of apartment blocks, separated by paved areas, with the greenery playing the role of visual barriers for the ground floor atrium gardens, and therefore not offering any functional value. Looking at the surface area data, *Viška Sončava* and *Celovški Dvori* residential complexes show a decent amount of functional areas (6829,84 m<sup>2</sup> and 12976,17 m<sup>2</sup>); however in fact these are all pedestrian areas and tartan-covered playgrounds, with no greenery and experiential value. The largest proportion of functional open and green areas can be found in *Bonifacija* estate (47557,51 m<sup>2</sup> or 29,48 m<sup>2</sup> per resident).

The graphical presentation of observation results shows the use of space according to the 'Category of Activity'. The functionality of space is mostly revealed by the two subcategories of the action of spending time outdoors, which includes 'active in space' and 'passive in space'. The activities which have been placed into one of those two categories range from child's play, playful running and trampoline jumping, minding children while they play, sitting on a bench, chatting, etc. Alongside the graphical presentation of active and passive spatial uses, another use of space is shown – illustrating children's active use of space (in most cases child's play), which was achieved by filtering data combining the 'Category of Activity' and 'Age Group' categories. The latter was carried out in the case of two residential areas, which are most different in terms of the quantity of functional open spaces and the possibilities of spending time outdoors: *Mesarska* residential complex and *Bonifacija* estate (Figure 1 and Figure 2).

The programme of open spaces in the case of *Mesarska* residential complex comprises of some benches at the edge of the site and one children's playground. Despite the scarce offer of programmes in this area, a relatively high amount of users was observed during field study. The key question here is, what activities prevail in a space which offers little programme options. According to observations, the majority of open spaces between the lines of apartment blocks of *Mesarska* complex, serves a transitory purpose (Figure 2). The children's playground is too small to meet the needs of the residents and is therefore usually used beyond its capacity. Regardless of a slightly more consistent open space design *Viška Sončava* complex was observed to be predominantly empty of users; which is also the case of *Nova Grbina* complex, often observed deserted despite the larger areas of open spaces and programmes in comparison to other new developments in the study. Spending time outdoors in the open spaces of *Mesarska*, *Viška Sončava* and *Nova Grbina* complexes is limited to the youngest children, while older children with different needs and the elderly residents do not have appropriate options to do so. Residential landscapes of *Celovški Dvori* show a very modest selection of natural elements and greenery, however they are the richest in the context of programme, when compared to other cases in the study. Observations showed many users in this residential area, mostly children, who were socialising, running around the area, cycling or using scooters. The results of observations in *Celovški Dvori* similarly show the largest amount of youngest users, while the elderly residents are in minority, except the ones minding the children. *Celovški Dvori* are a clear case of a residential complex, where observations showed a severe flaw in functionality. At first glance this complex actually seems extremely dynamic and rich in uses; however the results must be paired with the social profile of residents. Due to the social status of a part of the estate, the prevailing residents have a low level of education and are economically disadvantaged, additionally there is a high concentration of foreign residents (Mladenovič, 2011). The sense of security in this estate, the ability to identify with the environment and assessment of open space appeal

and functionality are the questions that remain unanswered in the case of *Celovški Dvori*.

Out of all five residential areas included in this study, *Bonifacija* estate demonstrated the most diverse uses of open areas, by the large number of different observed activities as well as through a wide range of observed age groups involved in them. The latter stands out even more severely when comparing *Mesarska* complex with *Bonifacija* estate (Figure 1 and Figure 2), showing children active in space: in the first case of *Mesarska*, the users are confined to one specific area, the children's playground, which is, as mentioned before, used beyond its capacities and will increasingly continue to be overused when new residents occupy the empty properties; while the active children are equally distributed through the space of residential landscapes in *Bonifacija* estate, and are more equally represented in relation to other users. In the case of *Bonifacija* estate children's activities also displayed most imagination. A large quantity of children's play activities were observed outside of playgrounds, especially in areas with diverse landscape features such as the edges between open spaces and vegetation and in combination with undulating terrain, consistent with literature arguing that imaginative child's play is always stronger in places, which do not define the uses (Kučan in sod., 2010).

Activities related to spending time outdoors in *Bonifacija* estate were observed in areas, where there are existing possibilities to do so (benches, playgrounds, trampolines, diverse landscape features and boundary elements, which increase the experiential value of space), while the footpaths show transitory uses. On the contrary, the residential landscapes of *Mesarska* complex are predominantly used for transit, which confirms the hypothesis that poor programme equipment and the lack of open areas lead to a reduced variety of spatial uses. British research also confirms a high response from the residents when offered well accessible, high quality green open areas. In such circumstances, people tend to spend more time outdoors, which has a positive effect on life expectancy, health, happiness and general wellbeing, which is reflected in the efficiency of individuals and the whole society. The British also note the direct correlation between using green open spaces in childhood and the state of health and lifestyle habits in adulthood (Thompson, 2007), which is of great importance for children growing up in residential areas.

### **Conclusions and research perspectives**

At the beginning of the research, the qualitative and quantitative differences between old and new residential estates were quantified and verified: the new ones are smaller in total surface area, they are planned to accommodate a large density of residents compared to the old estates; the open space programme usually includes only children's playgrounds, which are inadequate according to general recommendations. Programmes for older children and other age group residents are very rarely provided. The final appearance of the new

collective developments is a result of property shortage and unavailability of space in the past, as well as a lack of spatial norms, guidelines and regulations, which would commit the developers to adequate dimensioning, equipping and design of residential open spaces (Simoneti et al., 2006). The basis of this research is a comparative study between the old and the new residential estates, however all older estates are not best quality examples; the first post-war collective developments aimed to address the critical accommodation shortage. In addition, lifestyles have changed through time, the economy has improved, the standard of living has increased and people's expectations have risen and changed. What was in the past perceived as an ideal living environment, has with time been given a new connotation, as some estates began to be linked to criminal activity, social exclusion, unemployment, ethnical minorities, etc. In the context of increasing challenges of large residential estates throughout Europe, much attention is given to their renewal and regeneration, aimed to meet the needs of the new user profile (Kempen et al., 2007). These challenges however do not negate the hypothesis that their open spaces are of higher quality than in the new developments; they merely show a possibility that these challenges might cause residents to see their estates in a different way than originally intended.

The method of observations and behavioural mapping, used in the second research stage proved the hypothesis that poor equipment and the lack of open areas lead to a reduced variety of spatial uses and do not support a healthy lifestyle. This is shown by a comparative study of observation results of *Bonifacija* estate and the newer developments; most evidently in the case of *Mesarska* residential complex. Nonetheless, the observation results show only a partial image, as there are certain questions that remain unanswered in the background of recorded activities. Being mere slices of the continuity of action, observation results must be understood as approximation to the actual state of open space functionality. A part of uncertainty remains due to activities performed outside of observation periods. Additionally, some of the observed users may be external visitors and not necessarily local residents. And finally, the mere emergence of users in a certain place does not guarantee its success; the questions not addressed by the observation method are in particular the general welfare and comfort of users, the ability to identify with the space and the feeling of security. Observations fail to record the users which find no appropriate possibilities of spending time in the open space; therefore it is also questionable, how well a place accommodates different age groups. Due to a lack of open areas in new residential developments, the observations may even lead to wrong impressions, because a small place fills up quickly and may seem appealing and generally thriving, while in reality it may be a case of overloading a spatial capacity, discouraging other potential users from approaching.

In order to comprehensively interpret the success of residential landscapes, it is essential to connect the physical, social and symbolic spatial variables, which reveal the invisible links between the structure, behaviour and perception. The follow-up research will therefore adopt the method of questionnaires, which

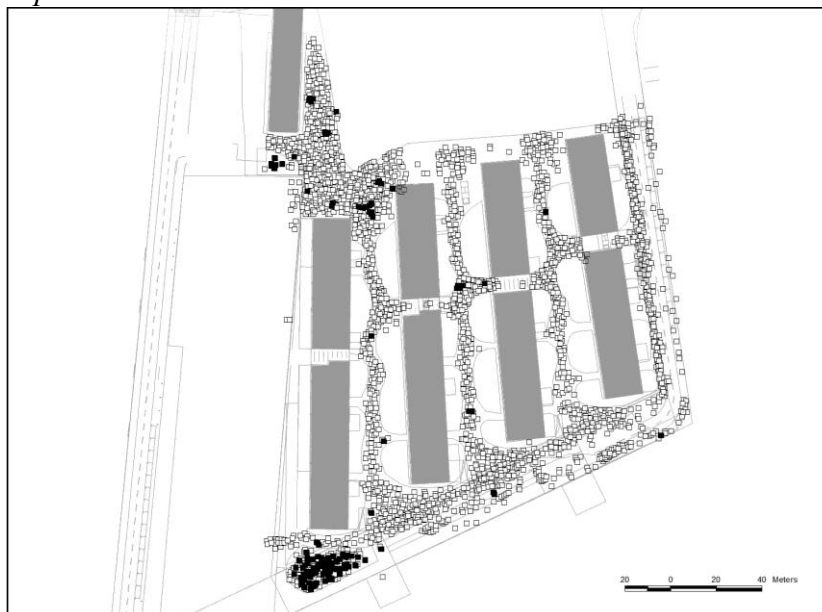
will be designed to collect the impressions and opinions of local residents. The survey is crucial for addressing the question about how well do people live in it and which life-styles they develop in response to spatial opportunities. Ogrin indicates that only the local residents' opinion survey can provide those answers (Ogrin, 2010), which is further justified by the fact, that people's perceptions change with generations (Mandič in sod., 2006).

**Figure 1.** *Results of observations and behavioural mapping in Bonifacija estate illustrating the uses of open space related to children actively spending their time in space, achieved by filtering the data using categories 'activities' and 'age groups' in relation to other activities observed in the same time*





**Figure 2.** Results of observations and behavioural mapping in Mesarska estate illustrating the uses of open space related to children actively spending their time in space, achieved by filtering the data using categories 'activities' and 'age groups' in relation to other activities observed in the same time



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