

PRELIMINARY ANALYSIS OF THE SPATIAL ATTRIBUTES AFFECTING STUDENTS' QUALITY OF LIFE AT THE UNIVERSITY OF RIJEKA

Sandro Grbac¹, Leo Malnar¹, Andrej Vorkapić¹, Diana Car-Pušić¹, Ivan Marović^{1*}

¹ University of Rijeka, Faculty of Civil Engineering, R. Matejčić 3, HR-51000 Rijeka, Croatia

Abstract

Recent development of the University of Rijeka campus area affects the quality of life (QoL) of the entire city of Rijeka population, especially student population, which comprises 13% of the city's total population. During Campus First Development Phase (2008-2011), four faculties found their place in the campus area with no student accommodation nearby. However, in the fall of 2016, during the Second Development Phase, which began in 2015, the first on-campus-accommodations will be provided to students. Technical and economic aspects are the core during investment planning and decision-making processes, while the user requirements are rarely taken into consideration from the actual end-user, resulting in superficial implementation in developing processes. The aim of this paper is to identify the most important indicators influencing the students' QoL in the city of Rijeka and to give an insight of student needs as an input for better investment planning and modelling of urban areas according to their needs. Using a web-based questionnaire as well as personal questioning, the data were collected, analyzed, and compared across four groups of variables (accommodation, faculty location, food and beverages, and out-of-curriculum activities). The conducted research gives a preliminary insight into the students' points of view, thus giving the decision-makers a necessary tool for making more student-oriented decisions in the future campus development phases as a long-term developing processes in the urban area management.

Key words

Investment planning; Project management; Quality of life; Spatial Attributes; User requirements

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*Corresponding author: Tel.: +385-51-265-921, Fax: +385-51-265-998,
E-mail address: ivan.marovic@uniri.hr

1 INTRODUCTION

An urban area is a spatial location characterized by high human population density and many built environment features in comparison to the rural areas surrounding it such as villages and hamlets. The world's population soared during the last several decades up to 7.43 billion people today [1], of which the global urban population comprised 3.96 billion. Increasing population density in urban areas is closely followed by a number of negative technical, economic, environmental and social aspects. Those aspects can significantly affect quality of life (QoL) as well as its sustainability from a long-term perspective.

Universities have a variety of important roles in economic, social and cultural development in their host urban area, and the rich potential of university/city government relationships is often overwhelmed by day-to-day conflicts over everything from planning and land use to transportation and noise [2]. A way to achieve a good university/city government relationship is collaboration where the processes that support it are beneficial for both parties as they continuously pursue their mutual strategic objectives.

The aim of this paper is to identify the most important indicators influencing the students' QoL in the city of Rijeka and to give an insight of student needs as an input for better investment planning and modelling of urban areas according to their needs. This research has been carried out in order to demonstrate which indicators should be given due attention from respective authorities so that sustainable decisions in urban area management can be made.

This paper is structured as following: Firstly, the research background is introduced. Secondly, the methodology used in this research is presented. Thirdly, the survey results are presented, followed by discussion. Finally, the conclusions are drawn for the conducted survey regarding the attributes that are affecting students' QoL at the University of Rijeka.

2 LITERATURE REVIEW / RESEARCH BACKGROUND

Chatterton [3] stated that “the university has always claimed the world, not its host city, as its domain” where the university can be seen as cultural interface with its community. The traditional cultural role of the university was a product of a specific set of historical circumstances related to a nationally framed education and cultural infrastructure. Today's new circumstances are constantly influencing universities in order to change their relationship with community. These circumstances can be understood as a number of push and pull factors which, considered together, are encouraging universities to engage more with their locality or region [3] while at the same time being exposed to greater levels of globalization and the need for nonlocal and translocal connections in order to succeed. In sum, territoriality is a complex issue for universities, especially when it is locally viewed.

Nowadays, housing comfort is influenced by a number of different factors, some of which can be controlled on an individual level (such as thermal characteristics of the building [4], quality of ventilation [5], presence of an elevator [6], quality of sound insulation [7], etc.). All of these are equally important in student residence buildings or dormitories besides their location (on or off the campus area) in the city. Those “indoor factors” are mostly technical in origin and are subject to the investor during the project's design phase, construction, or in some cases to the resident during the operation time of a residential unit.

Some authors researched those factors of technical origin, aligning them to different project phases, while others tried to develop a whole spectrum of urban sustainable indicators [8, 9, 10, 11, 12] making the future modelling of urban area more sustainable. This research is based on previous ones [10, 13, 14] where the general urban indicators were identified and evaluated. Regarding university surroundings researchers focused on the students' needs and satisfaction with their host city [15] as well as their satisfaction with their universities [16].

3 RESEARCH METHODOLOGY

This research aims to examine the most important indicators influencing the students' QoL in the city of Rijeka and to give an insight of student needs as an input for better investment planning and modelling of urban areas according to their needs.

The examinees were not given the possibility to create their own list of indicators. They could only give their individual estimate on a questionnaire by the Likert scale (1 – very bad, 2 – bad, 3 – average, 4 – good, 5 – very good) in which they could specify their level of agreement or disagreement for a series of statements.

3.1 Study area

The city of Rijeka is the third largest city in the Republic of Croatia (with a total population of 128,624 [17]), and the largest city in the Primorje-Gorski Kotar County. It is situated on the northernmost shore of the Bay of Kvarner (45°21' N. lat. 14°26' E. long.) where the Mediterranean is closest to the countries of Central Europe. As the shore/terrain is very narrow, with lot of elevations from 0 to 441 m, the city of Rijeka spreads along the shore more than 17 km, giving the total city area of 44 km². Given the high population density (2,933 residents per km²), lots of citizens live in skyscrapers and other 5 or more-storey buildings (in the city center) built during Rijeka's expansion period during the 19th and 20th centuries when the city was an important harbor and good trading post.

The University of Rijeka (UNIRI) was founded in 1973 as a logical expansion of higher education institutions in western Croatia whose roots date back to the 17th century when the Rijeka Jesuit gymnasium was established [18]. Today, the University of Rijeka is a high research oriented university integrated into the European Research Area and into the European Higher Education Area with a strong mission [19] to be “engaged in scientific, artistic and development research, providing undergraduate, master's, post-master's and lifelong learning education founded on research, and stimulating the social and economic development of its region”. It is comprised of 9 faculties, 1 academy, 4 university departments and several centers for research and development.

In 2003 realization of the idea University Campus (Campus) in the city of Rijeka begin in the area of a former military base. Several existent buildings were renovated, and in 2005 the first Campus occupant became the newly constituted Academy of Applied Arts. During Campus' first development phase (2008-2011) four faculties (Faculty of Humanities and Social Studies, Faculty of Teacher Education, Faculty of Civil Engineering and University Departments) found their place in the Campus area with no student accommodation nearby. Today, these University constituents along with the Student Centre (i.e. restaurant) are situated in the Campus area while the rest of the constituents are scattered throughout the city of Rijeka (Figure 1).

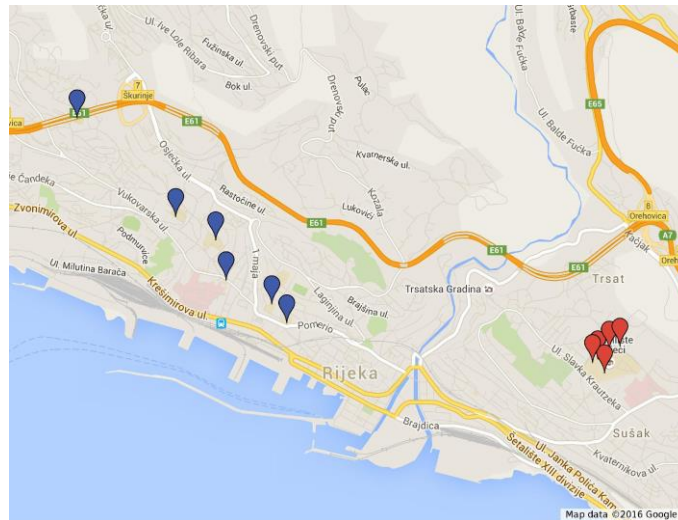


Fig. 1: Spatial distribution of UNIRI Constituents (red – on Campus, blue – off Campus)

During the second development phase (2014-2016) the three 5-storey buildings were built, representing the first on-campus-accommodation which will be provided to students in the 2016/2017 academic year.

3.2 Survey and data

Firstly, the performed literature review has served the authors as a starting point for creating an appropriate list of criteria according to which of the requirements on the quality of residential environment will be evaluated. Afterwards, particular indicators were discussed with the panel of experts in order to confirm the relevant ones and to assemble the questionnaire. The final list consists of 16 indicators (Table 1) comprising the different standpoints i.e. satisfaction levels. Indicators were classified into four groups (accommodation, faculty location, food and beverages, and out-of-curriculum activities) based upon their fundamental characteristics.

Tab. 1: List of assessment indicators

Accommodation (AC)	Faculty location (FL)
<ol style="list-style-type: none"> 1. The most important thing when choosing accommodation (closeness to the faculty, closeness to the student canteen, closeness to the city center) 2. Neighborhood contents (shops, café bars, apothecary, etc.) 3. Capacity of student dormitory 4. Living conditions in student dormitory 	<ol style="list-style-type: none"> 1. Transportation for coming to faculty (by foot, by bicycle, by car, by public transportation) 2. Acquired time between habitation place and faculty 3. Public transport connections 4. Faculty infrastructure and equipment
Food and beverages (FB)	Out-of-curriculum activities (OA)
<ol style="list-style-type: none"> 1. Consuming food (at home, in central student canteen in the city center, in student canteen on Campus) 2. Quality and diversity of food in student canteens 3. Frequency of eating in student canteens (almost never, once a week, several times a week, every day) 4. Restaurant offerings available to students 	<ol style="list-style-type: none"> 1. Nightlife (indoor and outdoor) 2. Quantity and quality of social events in the city of Rijeka 3. Accessibility and possibility for sport and recreation (indoor and outdoor) 4. Advertising of sport events

The target examinees in this survey were current students of UNIRI, considering both students from Rijeka (students who live in their family residencies) and students who came to Rijeka to study (students who live in dormitory and students who live in rented apartments and flats). Table 2 shows the number of students at the University of Rijeka during the years 2008 through 2016.

Tab. 2: Number of students at the University of Rijeka (author's modification according to public University data [18])

Academic year	No. of students on Campus	No. of students off Campus	Number of total students
2008/2009	320	17,944	18,264
2009/2010	309	18,904	19,213
2010/2011	2,303	16,998	19,301
2011/2012	2,881	15,389	18,270
2012/2013	3,433	13,298	16,731
2013/2014	3,675	13,168	16,843
2014/2015	3,919	12,747	16,666
2015/2016	3,973	12,681	16,654

The data were collected using a web-based questionnaire as well as by personal questioning. At the end, a total of 789 questionnaires was collected.

4 RESULTS AND DISCUSSION

All examinees are aged 18 or older, and they are students (regular and/or vocational) at the University of Rijeka. As previously stated, the total student population varies over the years and examination conducted from December 2015 to March 2016 resulted in 789 examinees i.e. 4.74% of total student population dispersed over 11 UNIRI constituents. The distribution among examinees and their affiliation is shown in Table 3 as they are grouped into two categories: students who are from the city of Rijeka (students from Rijeka) and students who are not from the city of Rijeka (students outside Rijeka).

Tab. 3: Overview of examinees and their affiliation

University of Rijeka Constituents	Students from Rijeka	Students outside Rijeka	Total number of examinees
Academy of Applied Arts	8	42	50
Faculty of Civil Engineering	167	103	270
Faculty of Economics	4	23	27
Faculty of Engineering	13	36	49
Faculty of Health Care Studies	7	29	36
Faculty of Humanities and Social Studies	30	40	70
Faculty of Law	15	38	53
Faculty of Maritime Studies	45	78	123
Faculty of Medicine	8	14	22
Faculty of Teacher Education	13	38	51
Faculty of Tourism and Hospitality Management	0	0	0
University Departments	16	22	38

From the total number of examinees, 326 students (41.32%) are from the city of Rijeka and live with their families, while 463 students (58.68%) are not from the city of Rijeka and use dormitory (51 students) or live in rented apartments and flats (412 students). At the time the research was conducted there was only one dormitory in the city center with a total capacity of 649 beds. The spatial distribution of all examinees' residencies along the district boundaries of the city of Rijeka is shown in Figure 2.

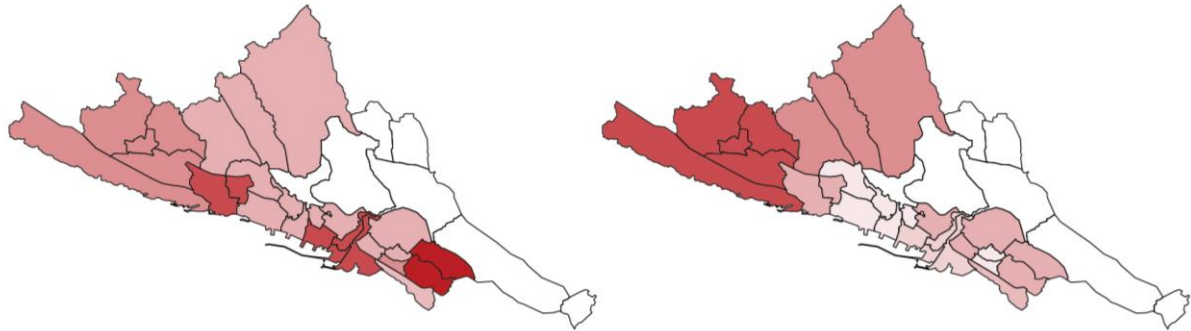


Fig. 2: Spatial distribution of examinees living districts (left – students outside Rijeka, right – students from Rijeka; red – higher number of examinees, white – no examinees)

Out of all examinees, 479 (60.71%) study at the on Campus facilities, while 310 (39.29%) study at the off Campus facilities. While the ratio between both student groups (from and outside Rijeka) who study on Campus is almost equal (234 against 245), the ratio between students who study off Campus is 92 against 218. The results of the examinees' questionnaires are given in Table 4.

Tab. 4: Results of examinees questionnaires

Examinees	Accommodation (AC)				Faculty location (FL)			
	From Rijeka	-	3.72	-	-	3.45	2.17	3.53
Outside Rijeka	1.56	3.73	2.67	2.81	2.77	1.86	3.76	3.79
Examinees	Food and beverages (FB)				Out-of-curriculum activities (OA)			
	From Rijeka	1.33	2.84	1.92	3.01	3.36	3.33	3.79
Outside Rijeka	1.98	2.93	2.93	3.23	3.53	3.51	3.55	3.14

With regard to accommodation group of indicators (AC-indicators), examinees stated that they were highly satisfied according to AC-indicators. The closeness to the faculty is an indicator of most importance. Students who are not from the city of Rijeka have greater opportunity to choose the location of their accommodation, according to indicator AC-1, than the other students, thus resulting with higher concentration in districts closer to the city center and districts near their university facilities and Campus. Students who are from the city of Rijeka mostly live in edge districts surrounding the Rijeka city center as those districts are more accommodation oriented. Such can be seen in Figure 2 where the spatial distribution is shown (left – students outside Rijeka; right – students from Rijeka). Students who live in Rijeka's neighborhood cities and settlements are not shown in Figure 2 but are part of results given in Table 2.

Chosen living districts provide them with good neighborhood contents and its variety (AC-2) as well as out-of-curriculum activities (OA) indicators. This can be seen as one of the most important reasons for influencing the students' QoL. On the other hand, the satisfaction level

of students who live in dormitory is average, according to its limited capacity (AC-3) and overall living conditions (AC-4).

All examined students are satisfied with public transport connections (FL-3) along the city as they spend up to 30 minutes commuting (FL-2). As they mostly use public transportation for commuting (mostly students who are from Rijeka), quite many of them come to their university facilities by foot. All of them are very satisfied with the faculty infrastructure and equipment, which is not surprising when one takes into account the age of the buildings (they were all recently reconstructed or built during the first and second development phases) and that they have all be lately equipped with state-of-the-art equipment.

Food and beverages group of indicators (FB-indicators) are focused on student canteens and other places which are affordable to students. A majority of students use such places on a daily basis, mostly focusing on the central student canteen in the city center. Even students who study on Campus (3,973 students i.e. 23.86% of total student population) prefer to use the central student canteen rather than the one on Campus, not only because of the closeness to their accommodations but also in their daily lives' tasks and habits. The on Campus restaurant is predominantly used by students whose accommodations are near Campus. Such is very interesting, and it can be considered that the existence of on-campus-accommodations are directly connected with on Campus food consumption. It is believed that the presence of the newly built dormitory on Campus, which will be available to students in the following academic year, will change such habits.

Even the fact that all indicators have not got the same grade the conclusions should not be taken separately one by one. Conclusions should be drawn in conjunction with their technical, economic, environmental and social aspects. The conducted research presents the preliminary insight into the students' points of view, thus giving the decision-makers a necessary tool for making more student-oriented decisions in the future campus development phases as long-term developing processes in the urban area management.

5 CONCLUSION

The aim of this paper is to identify the most important indicators influencing the students' QoL in the city of Rijeka and to give insight of their needs as an input for better investment planning and modelling of urban areas according to their needs. Using a web-based questionnaire as well as personal questioning, a total number of 789 questionnaires have been collected, analyzed and compared across four groups of variables (accommodation, faculty location, food and beverages, and out-of-curriculum activities). This preliminary research has shown that out of 16 predefined indicators the most significant ones are concerning location i.e. distance between accommodation and faculty as well as the contents of their neighborhood. Such is of great importance of both professional and private aspects of students' quality of life.

All presented data give valuable information and a clearer picture for decision-makers to make greater efforts regarding key indicators and end-users points of view as well as in implementation of all indicators and their preferences in the decision-making process. This can be a trigger for making long-term and sustainable decisions as well as for achieving sustainable solutions in the future campus development phases and developing processes in the urban area management.

REFERENCES

- [1] United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision. Available at: <http://geohive.com> (accessed 22 May 2016).
- [2] Curry, J.E. (2016). The dynamics of university/city government relationships: It's personal. *Metropolitan Universities*, **27**(1), pp. 56-70.
- [3] Chatterton, P. (2000). The cultural role of universities in the community: revisiting the university – community debate. *Environment and Planning A*, **32**, pp. 165-181.
- [4] Samardzioska, T., Cvetkovska, M., Lazarevska, M. and Gavriloska, A.T. Implementation of energy efficient measures in apartments in Macedonia, Proceedings of the 3rd International Symposium on Life-Cycle Civil Engineering: Life-Cycle and Sustainability of Civil Infrastructure Systems, IALCCE 2012, Vienna, Ed. A. Strauss, D.M. Fangopol, K. Bergmeister, Taylor & Francis Group, London, pp. 1702-1708, 2012.
- [5] Hughes, B.R., Chaudhry, H.N. and Calautit, J.K. (2014). Passive energy recovery from natural ventilation air streams. *Applied Energy*, **113**, pp. 127-140.
- [6] Zuluaga, M.C., Guallar-Castillon, P., Conthe, P., Rodriguez-Pascual, C., Graciani, A., Leon-Munoz, L.M., Gutierrez-Fisac, J.L., Regidor, E. and Rodriguez-Artalejo, F. (2011). Housing conditions and mortality in older patients hospitalized for heart failure. *American Heart Journal*, **161**(5), pp. 950-955
- [7] Mijić, M., Šumarac Pavlović, D., Todorović, D. and Radivojević, A. Sound insulation between dwellings in existing housing stock in Serbia, Proceedings of the Euronoise: European Conference on Noise Control 2012, Prague, pp. 1254-1259, 2012.
- [8] Bakar, A.H.A., Cheen, K.S. and Rahmawaty (2011). Sustainable housing practices in Malaysian housing development: towards establishing sustainability index. *International Journal of Technology*, **2**(1), pp. 84-93.
- [9] Egger, S. (2005). Determining a sustainable city model. *Environmental Modelling & Software*, **21**(9), pp. 1235-1246.
- [10] Hanak, T., Marović, I. and Pavlović, S. (2014). Preliminary identification of residential environment assessment indicators for sustainable modelling of urban areas. *International Journal for Engineering Modelling*, **27**(1-2), pp. 61-68.
- [11] Zavadskas, E., Viteikiene, M. and Šparauskas, J. (2007). Sustainable development assessment of cities and their residential districts. *Ekologija – Supplement*, **53**, pp. 49-54.
- [12] Shen, L., Ochoa, J., Shah, M.N. and Zhang, X. (2011). The application of urban sustainability indicators – a comparison between various practices. *Habitat International*, **35**(1), pp. 17-29.
- [13] Hanak, T., Marović, I. and Aigel, P. (2015). Perception of residential environment in cities: a comparative study. *Procedia Engineering*, **117**, pp. 500-506.
- [14] Marović, I. and Hanak, T. (2013). Identification of indicator influence in residential environment assessment. *Proceedings of the Faculty of Civil Engineering, University of Rijeka*, **16**, pp. 113-127.
- [15] Insch, A. and Sun, B. (2013). University students' needs and satisfaction with their host city. *Journal of Place Management and Development*, **6**(3), pp. 178-191.
- [16] Petruzzellis, L., D'Uggento, A.M. and Romanazzi S. (2006). Student satisfaction and quality of service in Italian universities, *Managing Service Quality: An International Journal*, **16**(4), pp. 349-364.
- [17] The city of Rijeka (2013). City of Rijeka Development Strategy 2014-2020. Available at: <http://www.rijeka.hr> (accessed 15 March 2016).

- [18] University of Rijeka (2016). Information about the University. Available at: <http://www.uniri.hr> (accessed 7 May 2016).
- [19] University of Rijeka (2014). *Strategy 2014-2020*. Grafica Helvetica Rijeka. ISBN 978-953-7720-17-9.

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