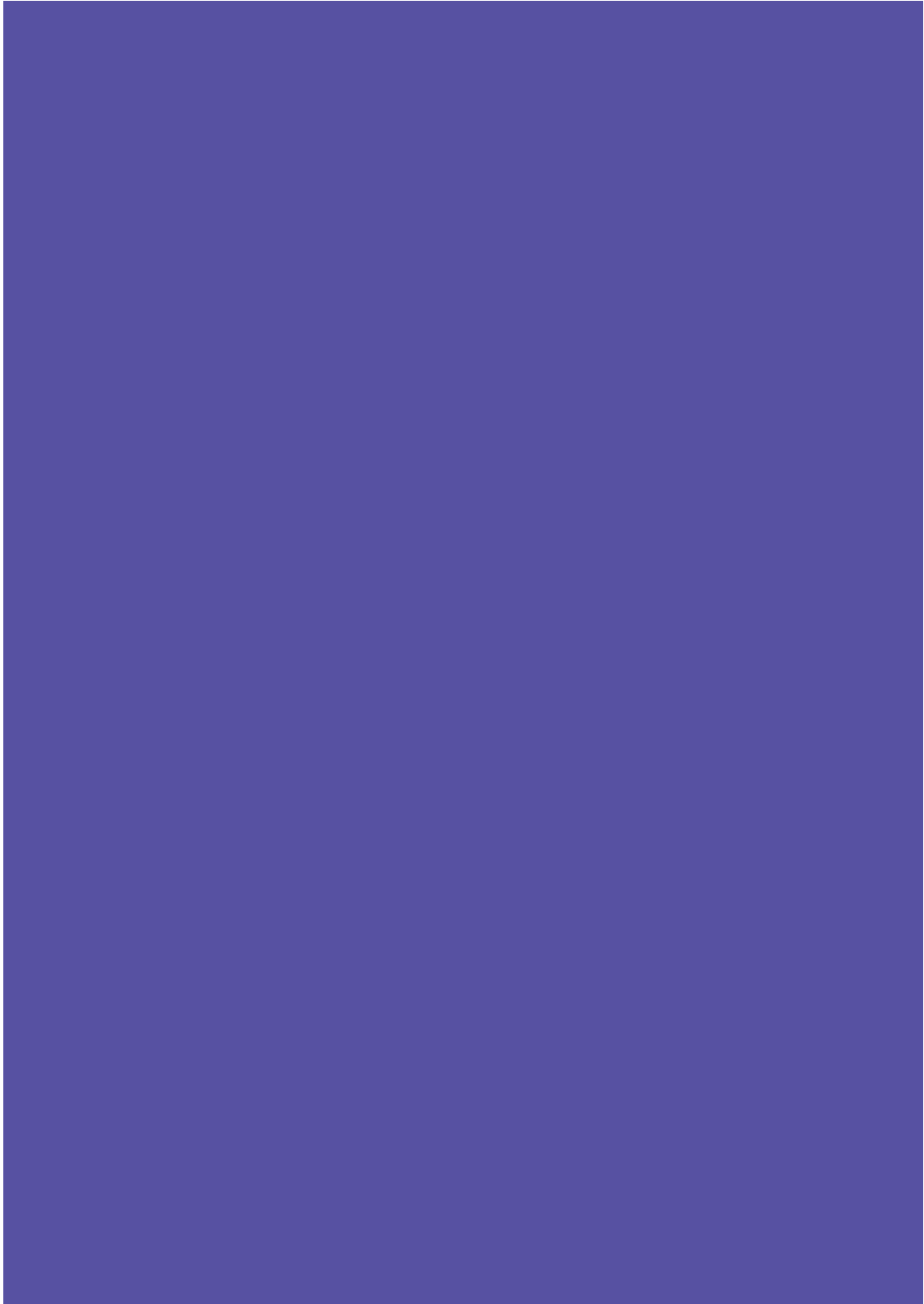


CON
FER
ENCE
PRO
CEED
INGS

**5th INTERNATIONAL
ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES**

EDITORS

ALEKSANDRA KRSTIĆ-FURUNDŽIĆ
MILENA VUKMIROVIĆ
EVA VANIŠTA LAZAREVIĆ
AND ALEKSANDRA ĐUKIĆ



CONFERENCE
PROCEEDINGS

5th INTERNATIONAL
ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

EDITORS

ALEKSANDRA KRSTIĆ-FURUNDŽIĆ
MILENA VUKMIROVIĆ
EVA VANIŠTA LAZAREVIĆ
AND ALEKSANDRA ĐUKIĆ

CON
FER
ENCE
PRO
CEED
INGS

5th INTERNATIONAL
ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

EDITORS

ALEKSANDRA KRSTIĆ-FURUNDŽIĆ
MILENA VUKMIROVIĆ
EVA VANIŠTA LAZAREVIĆ
AND ALEKSANDRA ĐUKIĆ

PLACES AND TECHNOLOGIES 2018

**THE 5TH INTERNATIONAL ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES**

EDITORS:

Aleksandra Krstić-Furundžić, Milena Vukmirović, Eva Vaništa Lazarević, Aleksandra Đukić

FOR PUBLISHER: Vladan Đokić

PUBLISHER: University of Belgrade - Faculty of Architecture

DESIGN: Stanislav Mirković

TECHNICAL SUPPORT: Jana Milovanović

PLACE AND YEAR: Belgrade 2018

ISBN: 978-86-7924-199-3

PRINTED BY: University of Belgrade - Faculty of Architecture

TABLE OF CONTENTS

TABLE OF CONTENTS

IMAGE, IDENTITY AND QUALITY OF PLACE: URBAN ASPECTS

THE EFFECT OF BEHAVIOURAL SETTINGS ON THE REGENERATION OF URBAN DYNAMIC ARTS, CASE STUDY: TEHRAN AZADI SQUARE Yasaman NEKOUI Ali Entezarinajafabadi	3
DEVELOPMENT SCENARIOS OF THE ZAGREB'S SATELLITE TOWN DUGOSELO - "THE CITY OF THE FUTURE" Lea Petrović Krajnik Damir Krajnik Ivan Mlinar	11
SUSTAINABILITY OF MODERN-DAY UTOPIAS AS SEEN IN MASS MEDIA Aleksandra Til	18
URBAN DENSIFICATION OF THE POST-SOCIALIST CITY AND ITS IMPLICATIONS UPON URBAN STRUCTURE: A STUDY OF NIS, SERBIA Milena Dinić Branković Ivana Bogdanović Protić Mihailo Mitković Jelena Đekić	25
MUSEUM QUARTERS VS CREATIVE CLUSTERS: FORMATION OF THE IDENTITY AND QUALITY OF THE URBAN ENVIRONMENT Ekaterina Kochergina	35
URBAN NON-MECHANICAL CODE AND PUBLIC SPACE Aleksandra Đukić Valentina Milovanović Dubravko Aleksić	43
ADDRESSING THE SOCIO-SANITARY EMERGENCY IN AFRICA: THEORIES AND TECHNIQUES FOR DESIGNING A COMMUNITY HEALTH CENTRE IN MALI Adolfo F. L. Baratta Laura Calcagnini Fabrizio Finucci Cecilia M. L. Luschi Antonio Magarò Massimo Mariani Alessandra Venturoli Alessandra Vezzi	50
THE NETWORK OF LOCAL CENTERS AS A TOOL FOR STRENGTHENING THE SUPER-BLOCK COMMUNITIES: BELGRADE VS. ROME Predrag Jovanović Aleksandra Stupar	58
TRANSFORMATION OF IDENTITY OF SAVAMALA DISTRICT IN BELGRADE Aleksandra Đukić Jelena Marić Tamara Radić	66
THE CULTURE OF MEMORY AND OPEN PUBLIC SPACE - BANJA LUKA Jelena Stankovic Milenko Stankovic	73

IMAGE, IDENTITY AND QUALITY OF PLACE: ARCHITECTURAL ASPECTS

IMPROVEMENT OF SOCIAL HOUSING THROUGH THE MIXING CONCEPT IMPLEMENTATION Nataša Petković Grozdanović Branislava Stojković Vladana Petrović Aleksandar Keković Goran Jovanović	83
---	----

IMPROVING THE IDENTITY OF NON – SURROUNDED COMMUNAL SPACES WITH USING ARCHITECTURAL PROGRAMING. CASE STUDY: NAJAF ABAD (ESFAHAN), IMAM KHOMEINI SQUARE	91
Ali Entezarinajafabadi YasamanNekoui	
A CONTRIBUTION TO THE STUDY OF THE ARCHITECTURAL OPUS OF NATIONAL STYLE WITH MODELS IN FOLK ARCHITECTURE AND NEW INTERPOLATIONS	100
Katarina Stojanović	
SHOPPING CENTRE AS A LEISURE SPACE: CASE STUDY OF BELGRADE	108
Marija Cvetković Jelena Živković Ksenija Lalović	
ARCHITECTURAL CREATION AND ITS INFLUENCE ON HUMANS	119
Nikola Z. Furundžić Dijana P. Furundžić Aleksandra Krstić-Furundžić	
INNOVATIVE METHODS AND TECHNOLOGIES FOR SMART(ER) CITIES	
POTENTIAL OF ADAPTING SMART CULTURAL MODEL: THE CASE OF JEDDAH OPEN- SCULPTURE MUSEUM	131
Sema Refae Aida Nayer	
AN INNOVATIVE PROTOCOL TO ASSESS AND PROMOTE SUSTAINABILITY IN RESPONSIBLE COMMUNITIES	140
Lucia Martincigh Marina Di Guida Giovanni Perrucci	
GEOHERMAL DISTRICT HEATING SYSTEMS DESIGN: CASE STUDY OF ARMUTLU DISTRICT	148
Ayşe Fidan ALTUN Muhsin KILIC	
DATA COLLECTION METHODS FOR ASSESSMENT OF PUBLIC BUILDING STOCK REFURBISHMENT POTENTIAL	157
Ljiljana Đukanović Nataša Čuković Ignjatović Milica Jovanović Popović	
SMART HOSPITALS IN SMART CITIES	165
Maria Grazia Giardinelli Luca Marzi Arch. PhD Valentina Santi	
INNOVATIVE METHODS AND TOOLS	
PRIMARY AND SECONDARY USES IN CITIES – PRINCIPLES, PATTERNS AND INTERDEPENDENCE	175
Marina Carević Tomić Milica Kostreš Darko Reba	
MODELLING AND ANALYSING LAND USE CHANGES WITH DATA-DRIVEN MODELS: A REVIEW OF APPLICATION ON THE BELGRADE STUDY AREA	183
Mileva Samardžić-Petrović Branislav Bajat Miloš Kovačević Suzana Dragičević	
INNOVATIVE DECISION SUPPORT SYSTEM	190
Mariella Annese Silvana Milella Nicola La Macchia Letizia Chiapperino	

URBAN FACILITY MANAGEMENT ROLE	196
Alenka Temeljotov Salaj Svein Bjørberg Carmel Margaret Lindkvist Jardar Lohne	
ANALYSES OF PUBLIC SPACES IN BELGRADE USING GEO-REFERENCED TWITTER DATA	205
Nikola Džaković Nikola Dinkić Jugoslav Joković Leonid Stoimenov Aleksandra Djukić	
SENTIMENT ANALYSIS OF TWITTER DATA FOR EXPLORATION OF PUBLIC SPACE SENTIMENTS	212
Miroslava Raspopovic Milic Milena Vukmirovic	
CITIES AND SCREENS: ARCHITECTURE AND INFORMATION IN THE AGE OF TRANSDUCTIVE REPRODUCTION	217
Catarina Patrício	
CITIZEN EMPOWERMENT, PUBLIC PARTICIPATION AND DEMOCRATIC CITIES	
CITIES AS PLATFORMS FOR SOCIAL INNOVATION: AN INVESTIGATION INTO HOW DIGITAL PLATFORMS AND TOOLS ARE USED TO SUPPORT ENTREPRENEURSHIP IN URBAN ENVIRONMENTS	227
Margarita Angelidou	
PROBLEM ISSUES OF PUBLIC PARTICIPATION IN HERITAGE CONSERVATION: GEO-MINING PARKIN SARDINIA	235
Nađa Beretić Arnaldo Cecchini Zoran Đukanović	
A METHODOLOGY FOR STAKEHOLDER EMPOWERMENT AND BENEFIT ASSESSMENT OF MUNICIPAL LONG-TERM DEEP RENOVATION STRATEGIES: A SURVEY WITHIN SOUTH-EASTERN EUROPEAN MUNICIPALITIES	242
Sebastian Botzler	
THE OPPORTUNITIES OF MEDIATED PUBLIC SPACES: CO-CREATION PROCESS FOR MORE INCLUSIVE URBAN PUBLIC SPACES	249
Inês Almeida Joana Solipa Batista Carlos Smaniotta Costa Marluci Menezes	
ARCHITECTURE AS SOCIAL INNOVATION: EDUCATION FOR NEW FORMS OF PROFESSIONAL PRACTICE	255
Danijela Milovanović Rodić, Božena Stojić Aleksandra Milovanović	
CITY AS A PRODUCT, PLANNING AS A SERVICE	262
Viktorija Prilenska Katrin Paadam Roode Liias	
RAJKA: CHANGING SOCIAL, ETHNIC AND ARCHITECTURAL CHARACTER OF THE "HUNGARIAN SUBURB" OF BRATISLAVA	269
Dániel Balizs Péter Bajmócy	
POSSIBLE IMPACT OF MIGRANT CRISIS ON THE CONCEPT OF URBAN PLANNING	279
Nataša Danilović Hristić Žaklina Gligorijević Nebojša Stefanović	

TOWARDS DIMINUISHING DISADVANTAGES IN MIGRATION ISSUES IN SERBIA
(FROM 2015) THROUGH PROPOSAL OF SOME MODELS 287
Eva Vaništa Lazarević Jelena Marić Dragan Komatina

ARCHITECTURAL DESIGN AND ENERGY PERFORMANCE OF BUILDINGS

APPLICATION OF ENERGY SIMULATION OF AN ARCHITECTURAL HERITAGE
BUILDING 303
Norbert Harmathy Zoltán Magyar

APPLICATION OF TRADITIONAL MATERIALS IN DESIGN OF ENERGY EFFI-
CIENT INTERIORS 311
Vladana Petrović Nataša Petković Grozdanović Branislava Stoiljković Aleksandar Keković
Goran Jovanović

DETERMINATION OF THE LIMIT VALUE OF PERMITTED ENERGY CLASS FOR
THE KINDERGARTENS IN THE NORTH REGION OF BOSNIA AND HERZEGOVI-
NA 318
Darija Gajić Biljana Antunović Aleksandar Janković

ARCHITECTURAL ASPECTS OF ENERGY AND ECOLOGICALLY RESPONSIBLE
DESIGN OF STUDENT HOUSE BUILDINGS 326
Malina Čvoro Saša B. Čvoro Aleksandar Janković

ENERGY EFFICIENCY ANALYSES OF RESIDENTIAL BUILDINGS THROUGH
TRANSIENT SIMULATION 332
Ayşe Fidan ALTUN Muhsin KILIC

INNOVATIVE TECHNOLOGIES FOR PLANNING AND DESIGN OF "ZERO-ENER-
GY BUILDINGS" 340
Kosa Golić Vesna Kosorić Suzana Koprivica

ENERGY REFURBISHMENT OF A PUBLIC BUILDING IN BELGRADE 348
Mirjana Miletić Aleksandra Krstić-Furundžić

TPOLOGY OF SCHOOL BUILDINGS IN SERBIA: A TOOL FOR SUSTAINABLE
ENERGY REFURBISHMENT 357
Nataša Čuković Ignjatović Dušan Ignjatović Ljiljana Đukanović

ARCHITECTURAL DESIGN AND NEW TECHNOLOGIES

EVALUATION OF ADVANCED NATURAL VENTILATION POTENTIAL IN THE
MEDITERRANEAN COASTAL REGION OF CATALONIA 367
Nikola Pesic Jaime Roset Calzada Adrian MurosAlcojor

TRENDS IN INTEGRATION OF PHOTOVOLTAIC FACILITIES INTO THE BUILT
ENVIRONMENT 375
Aleksandra Krstić-Furundžić Alessandra Scognamiglio, Mirjana Devetaković, Francesco
Frontini, Budimir Sudimac

INTEGRATION OF NEW TECHNOLOGIES INTO BUILDINGS MADE FROM CLT	389
Milica Petrović Isidora Ilić	
INTEGRATION OF SOLAR WATER HEATING SYSTEMS INTO GREEN BUILDINGS BY APPLYING GIS AND BIM TECHNOLOGIES	394
Kosa Golić Vesna Kosorić Dragana Mecanov	
IMPLEMENTING ADAPTIVE FAÇADES CONCEPT IN BUILDINGS DESIGN: A CASE STUDY OF A SPORTS HALL	402
Aleksandar Petrovski Lepa Petrovska-Hristovska	
SIMULATION AIDED ENERGY PERFORMANCE ASSESSMENT OF A COMPLEX OFFICE BUILDING PROJECT	409
Norbert Harmathy László Szerdahelyi	
ARCHITECTURAL DESIGN AND PROCESS	
THE HABITABLE BRIDGE: EXPLORING AN ARCHITECTURAL PARADIGM THAT COMBINES CONNECTIVITY WITH HABITATION	421
Ioanna Symeonidou	
REFURBISHMENT OF POST-WAR PREFABRICATED MULTIFAMILY BUILDINGS	428
Aleksandra Krstić-Furundžić, Tatjana Kosić, PhD	
THE FUTURE (OF) BUILDING	438
Morana Pap, Roberto Vdović, Bojan Baletić	
COMPARISON OF ARCHITECTS' AND USERS' ATTITUDES TOWARD SPATIAL CHARACTERISTICS OF APARTMENTS	445
Ivana Brkanić	
DIGITAL VS. TRADITIONAL DESIGN PROCESS	453
Igor Svetel Tatjana Kosić Milica Pejanović	
CREATING THE EASTERN CAMPUS CONCEPT AT THE UNIVERSITY OF PÉCS - CONNECTED THE FACULTY OF BUSINESS AND ECONOMICS	461
Péter Paári Gabriella Medvegy Bálint Bachmann	
BUILDING STRUCTURES AND MATERIALS	
SUSTAINABILITY BENEFITS OF FERROCEMENT APPLICATION IN COMPOSITE BUILDING STRUCTURES	471
Aleksandra Nenadović Žikica Tekić	
POSSIBILITIES OF ENERGY EFFICIENT REFURBISHMENT OF A FAMILY VILLA IN BELGRADE: A CASE STUDY	479
Nenad Šekularac Jasna Čikić Tovarović Jelena Ivanović-Šekularac	

ENHANCING THE BUILDING ENVELOPE PERFORMANCE OF EXISTING BUILDINGS USING HYBRID VENTILATED FAÇADE SYSTEMS	485
Katerina Tsikaloudaki Theodore Theodosiou Stella Tsoka Dimitrios Bikas	
STRUCTURAL ASPECTS OF ADAPTIVE FACADES	493
Marcin Kozłowski Chiara Bedon Klára Machalická Thomas Wüest Dániel Honfi	
STRATEGIZING FOR INFORMAL SETTLEMENTS: THE CASE OF BEIRUT	500
Hassan Zaiter Francesca Giofrè	
THE IMPACT OF USERS' BEHAVIOUR ON SOLAR GAINS IN RESIDENTIAL BUILDINGS	509
Rajčić Aleksandar Radivojević Ana Đukanović Ljiljana	
PRESERVATION OF ORIGINAL APPEARANCE OF EXPOSED CONCRETE FACADES, CASE STUDY: RESIDENTIAL BLOCK 23, NEW BELGRADE	517
Nikola Macut Ana Radivojević	
ADAPTIVE REUSE	
CONVERSION AS MODEL OF SUSTAINABLE SOLUTION FOR DEVASTATED INDUSTRIAL COMPLEXES	529
Branko AJ Turnšek Aleksandra Kostić Milun Rancić	
SILO CONVERSION - POTENTIALS, FLEXIBILITY AND CONSTRAINTS	537
Branko AJ Turnsek Ljiljana Jevremovic Ana Stanojevic	
ARCHITECTURE OF MULTIPLE BEGINNINGS AS A TOOL OF SUSTAINABLE URBAN DEVELOPMENT	545
Milan Brzaković Petar Mitković Aleksandar Milojković Marko Nikolić	
INHABITING THE TOWER. THE PARADIGM OF THE FORTIFIED TOWERS OF MANI AND THE REUSE PROJECT	556
Rachele Lomurno	
ADAPTIVE REUSE THROUGH CREATIVE INDUSTRY TOOLS: CASE OF URAL-MASH, YEKATERINBURG, RUSSIA	564
Eva Vaništa Lazarević Timur Abdullaev, Larisa Bannikova	
URBAN MOBILITY, TRANSPORT AND TRAFFIC SOLUTIONS	
POLICY FOR REDUCING EMISSIONS IN AIRCRAFT OPERATIONS IN URBAN AEREAS BASED ON REGULATORY AND FISCAL MEASURES	579
Marija Glogovac Olja Čokorilo	
SIMULATING PEDESTRIAN BEHAVIOUR IN SCHOOL ZONES – POSSIBILITIES AND CHALLENGES	586
Ljupko Šimunović Mario Ćosić Dino Šojat Božo Radulović Domagoj Dijanić	

MODEL OF SMART PEDESTRIAN NETWORK DEVELOPMENT USING AN EDGE-NODE SPACE SYNTAX ABSTRACTION FOR URBAN CENTRES 593

Bálint Kádár

THE ROLE OF SMART PASSENGER INTERCHANGES IN THE URBAN TRANSPORT NETWORK 604

Bia Mandžuka, Marinko Jurčević, Davor Brčić

CLIMATE CHANGE, RESILIENCE OF PLACES AND HAZARD RISK MANAGEMENT

THE IMPACT OF CLIMATE CHANGES ON THE DESIGN ELEMENTS OF CONTEMPORARY WINERIES - CASE STUDIES 617

Branko AJ Turnšek Ana Stanojević LjiljanaJevremović

DETERMINATION OF COMMUNITY DEVELOPMENT POLICIES USING URBAN RESILIENCE AND SYSTEM DYNAMICS SIMULATION APPROACH 626

Zoran Keković Ozren Džigurski Vladimir Ninković

QUALITIES OF RESILIENT CITY IN SYSTEMS OF PLANNING SUSTAINABLE URBAN DEVELOPMENT. AN INTRODUCTORY REVIEW. 634

Brankica Milojević Isidora Karan

PLACE-BASED URBAN DESIGN EDUCATION FOR ADAPTING CITIES TO CLIMATE CHANGE 641

Jelena Živković Ksenija Lalović

IMPROVING URBAN RESILIENCE, INCREASING ENVIRONMENTAL AWARENESS: NEW CHALLENGE OF ARCHITECTURAL AND PLANNING EDUCATION 652

Aleksandra Stupar Vladimir Mihajlov Ivan Simic

URBAN RESILIENCE AND INDUSTRIAL DESIGN: TECHNOLOGIES, MATERIALS AND FORMS OF THE NEW PUBLIC SPACE 659

Vincenzo Paolo Bagnato

THERMAL COMFORT OF NIŠFORTRESS PARK IN THE SUMMER PERIOD 666

Ivana Bogdanović Protić Milena Dinić Branković Petar Mitković Milica Ljubenić

LANDSCAPE ARCHITECTURE AND NATURAL BASED SOLUTIONS

SMALL ISLANDS IN THE FRAMEWORK OF THE U.E. MARINE STRATEGY –
CHERADI'S ARCHIPELAGO IN TARANTO 679

Giuseppe d'Agostino Federica Montalto

LANDSCAPE AWARENESS AND RENEWABLE ENERGY PRODUCTION IN BOSNIA AND HERZEGOVINA 686

Isidora Karan Igor Kuvac Radovan Vukomanovic

SAVAPARK – A RESILIENT AND SUSTAINABLE NEW DEVELOPMENT FOR ŠABAC	692
Milena Zindović Ksenija Lukić Marović	
ADRIATIC LIGHTHOUSES. STRATEGIC VISIONS AND DESIGN FEATURES	702
Michele Montemurro	
LANDSCAPE ARCHITECTURE AND INFRASTRUCTURES: TYPOLOGICAL INVENTORY OF GREEK WATER RESERVOIRS' LANDSCAPE	710
Marianna Nana Maria Ananiadou-Tzimopoulou	
THE BASIN OF THE MAR PICCOLO OF TARANTO AS URBAN AND LANDSCAPE "THEATRE"	717
Francesco Paolo Protomastro	
INTERWEAVING AND COMPLEXITIES OF THE MAN-MADE ENVIRONMENT AND NATURE	725
Dženana Bijedić Senaida Halilović Rada Čahtarević	
BUILT HERITAGE, NEW TECHNOLOGIES AND DANUBE CORRIDOR	
DIGITAL TOOLS IN RESEARCHING HISTORICAL DEVELOPMENT OF CITIES	737
Milena Vukmirović Nikola Samardžić	
APPLICATION OF BIM TECHNOLOGY IN THE PROCESSES OF DOCUMENTING HERITAGE BUILDINGS	751
Mirjana Devetaković Milan Radojević	
GIS-BASED MAPPING OF DEVELOPMENT POTENTIALS OF UNDERVALUED REGIONS – A CASE STUDY OF BAČKA PALANKA MUNICIPALITY IN SERBIA	758
Ranka Medenica Milica Kostreš Darko Reba Marina Carević Tomić	
MAPPING THE ATTRACTIVITY OF TOURIST SITES ALL ALONG THE DANUBE USING GEOTAGGED IMAGES FROM FLICKR.COM	766
Bálint Kádár Mátyás Gede	
INVENTARISATION AND SYSTEMATIZATION OF INDUSTRIAL HERITAGE DOCUMENTATION: A CROATIAN MATCH FACTORY CASE STUDY	777
Lucija Lončar Zlatko Karač	
CULTURAL LANDSCAPE OF ANCIENT VIMINACIUM AND MODERN KOSTOLAC – CREATION OF A NEW APPROACH TO THE PRESERVATION AND PRESENTATION OF ITS ARCHAEOLOGICAL AND INDUSTRIAL HERITAGE	785
Emilija Nikolić Mirjana Roter-Blagojević	
ALTERNATIVE TERRITORIAL CHANGES OF HOUSING ESTATES TOWARDS A SUSTAINABLE CONCEPTION	793
Regina Balla	

HERITAGE, TOURISM AND DANUBE CORRIDOR

- CULTURAL TOURISM IN THE BALKANS: TRENDS AND PERSPECTIVES. 807
Kleoniki Gkioufi
- CULTURAL TOURISM AS A NEW DRIVING FORCE FOR A SETTLEMENT REVIT-
ALISATION: THE CASE OF GOLUBAC MUNICIPALITY IN IRON GATES REGION,
SERBIA 814
Branislav Antonić Aleksandra Djukić
- CULTURAL AND HISTORICAL IDENTITY OF TWIN CITIES KOMÁR-
NO-KOMÁROM 823
Kristína Kalašová
- PLACE NETWORKS. EXPERIENCE THE CITY ON FOOT 830
Milena Vukmirovic Aleksandra Djukić Branislav Antonić
- STORIES WITH SOUP - CULTURAL HERITAGE MOMENTS ALONG THE DAN-
UBE RIVER 837
Heidi Dumreicher Bettina Kolb Michael Anranter
- ETHNIC AND TOPONYMIC BACKGROUND OF THE SERBIAN CULTURAL HERI-
TAGE ALONG THE DANUBE 844
Dániel Balizs Béla Zsolt Gergely

SPATIAL AND RURAL DEVELOPMENT

- BEAUTIFUL VILLAGE PROJECT: AN ARCHITECTURAL AND LANDSCAPE DESIGN
STRATEGY FOR NON-HERITAGE VILLAGES IN HEBEI PROVINCE 859
Dapeng Zhao Bálint Bachmann Tie Wang
- CHANGES IN DEVELOPMENT OF NORTHERN CROATIA CITIES AND MUNICI-
PALITIES FROM 1991 TO 2011: MULTIVARIABLE ANALYTICAL APPROACH 869
Valentina Valjak
- SPECIFICS OF DYNAMICS OF SHRINKING SMALL TOWNS IN SERBIA 879
Milica Ljubenović Milica Igić Jelena Đekić Ivana Bogdanović-Protić Ana Momčilović-Petroni-
jević
- BALANCED REGIONAL DEVELOPMENT OF RURAL AREAS IN THE LIGHT OF
CLIMATE CHANGE IN SERBIA– OPPORTUNITIES AND CHALLENGES 888
Milicalgić MilicaLjubenović Jelena Đekić Mihailo Mitković
- COLLABORATIVE RESEARCH FOR SUSTAINABLE REGIONALDEVELOPMENT:
EXPERIENCES FROM “LEARNING ECONOMIES” ITALY-SERBIA BILATERAL
PROJECT 899
Jelena Živković Ksenija Lalović Elena Battaglini Zoran Đukanović Vladan Đokić

ASSESSMENT OF VALUE OF BIOMASS ENERGY POTENTIAL FROM AGRICULTURAL WASTE IN LESKOVAC FIELD AND ITS IMPORTANCE IN THE SETTLEMENT DEVELOPMENT PLANNING 908

Mihailo Mitković Dragoljub Živković Petar Mitković Milena Dinić Branković Milica Igić

MULTIFUNCTIONAL FACILITIES – FROM PRIMARY FUNCTIONS TO SPATIAL LANDMARKS (STUDY OF TWO CASES IN SERBIA AND BOSNIA AND HERZEGOVINA) 918

Aleksandar Videnovic Milos Arandjelovic

IMPROVING URBAN RESILIENCE, INCREASING ENVIRONMENTAL AWARENESS: NEW CHALLENGE OF ARCHITECTURAL AND PLANNING EDUCATION

Aleksandra Stupar¹

Associate professor, Faculty of Architecture in Belgrade, Bulevar kralja Aleksandra 73/II,
e-mail stupar@afrodita.rcub.bg.ac.rs

Vladimir Mihajlov

Assistant professor, Faculty of Architecture in Belgrade,
e-mail mihajlovladimir@yahoo.com

Ivan Simic

Researcher,
e-mail arh.ika@gmail.com

ABSTRACT

This paper considers recently introduced teaching methods at the University of Belgrade - Faculty of Architecture, conceptualized as a response to the issues of climate change and environmental awareness. The courses Urban structure (conducted on the 2nd year of bachelor studies during year 2013/14) and Studio Project 4 (the final year of Bachelor studies 2012/13) are used as examples of this practice. The paper also attempts to review the results of different curricula, i.e. the working strategies applied during the teaching process, providing an insight into the possible directions of the architectural/planning education, formulated according to the latest priorities defined by various referential institutions (e.g. RTPI, EDUCATE – Framework for Curriculum Development Environmental Design in University Curricula and Architectural Training in Europe).

The survey conducted in selected courses compares students' acquired and experiential knowledge, evaluating their ability to understand a set of problems related to urban resilience and environmental awareness in the context of climate change. One of key findings is that in alternative teaching methods students are faced with the problem that they have to understand completely, which motivates them to disclose relevant knowledge, without pre-determined recipes, and generate creative solutions to identified problems.

Keywords: Architectural education, learning models, urban resilience, environmental awareness, climate change

The introduction of alternative learning models at faculties of architecture

The problems of urban resilience and environmental awareness have become extremely important in the Age of climate change. Triggering issues of adaptation and mitigation, especially in urban areas, they have become an unavoidable part of education process in architectural and planning schools worldwide (Quality Assurance Agency for Higher Education - QAA, 2014). However, it is still debatable how to conduct teaching process in order to efficiently apply theoretical knowledge to everyday problems caused by climate change. In less established concepts i.e. interdisciplinary approaches necessary for studies of climate change, the possi-

¹ Corresponding author

bility for communication in improving knowledge is reduced, and there is no single definition of concepts and problems (Esterby-Smith & Araujo, 1999). Considering this, the paper argues that the use of alternative pedagogical models is desirable (and necessary) in the process of architectural/planning education. Also, adjusting to local context represents a priority, especially in developing countries, such as Serbia.

The current challenges brought by climate change and various environmental setbacks caused a growing interest in examining the connection between these occurring processes and the development of urban space (adaptation of buildings and urban areas, environmental hazards, detection of vulnerable places etc.), while the education of future experts represents another challenge (QAA, 2014). In the early stages of architectural training, a new intellectual framework and competencies are required (EDUCATE, 2012). Also, the pedagogical objectives for the education of architects for sustainable design are directed toward critical thinking and experiential abilities which could enable the synthesis of knowledge based upon real problems (Pedagogical Objectives in Sustainable Architectural Education in Sustainable Education - RIBA UK; Part 1, Part 2, Part 3). The essence of this process is represented by the Kolb's learning cycle (1984).

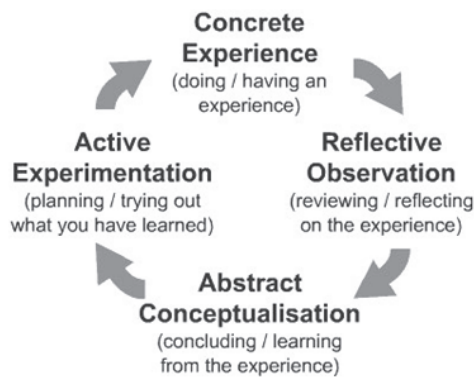


Figure 1: Kolb's learning cycle, in the context of critical thinking

Source: http://www.ldu.leeds.ac.uk/ldu/sddu_multimedia/kolb/static_version.php

Considering all above mentioned it is important to define the scope and level of necessary knowledge and skills focused on adaptation of urban structure to climate change and growing environmental threats.

Theoretical approach in Europe is based on the assumption of anticipatory learning of architects and planners, reliance to prior knowledge (sustainable development, resilience etc.), as well as on the link between key aspects (e.g. - climate change and urban development). Additionally, it is necessary to connect theoretical knowledge and practical work on case studies (Problem Based Learning) (QAA, 2014).

In the United States, the criteria and outcomes are even more specific. They are defined as understanding of a certain problem - capacity to classify, compare, summarize, explain or interpret information, and the ability to act - distinguish information depending on the effects of implementation (US National Architectural Accrediting Board -NAAB, 2009)

Finally, in developing countries (such as Serbia) not enough attention has been devoted to this topic. The concepts of resilience and sustainability (mostly declaratively included in all development strategies) have not been thoroughly associated with adaptation of urban structures and mitigation of environmental consequences. Therefore, it is necessary to connect knowl-

edge on sustainable development with environmental issues. These two aspects should not be separated in the process of education of architects and planners, because vulnerability to climate change is more stressed in developing countries (Banuri & Opschoor, 2007). Also, the process of learning should be adjusted to existing, local circumstances and limitations (specific problems, unavailable data, etc) and, therefore, the tactile knowledge becomes one of the key factors (Polanyi, 1958).

In alternative learning methods, two components of knowledge are especially important: cognitive (intuitive) and behavioral (experiential). They have important influence on successful understanding of the phenomena and creative solving of environmental problems. Consequently, a complex interaction between conscious and unconscious components of knowledge is needed (Single, Double loop learning...), as well the interaction between education and imagination, creativity, innovation and the capability of abstraction.

The Polygons of Research: Courses Urban structure and Studio Project 4

The paper attempted to evaluate the knowledge and experience of students, by reviewing the results of two different curricula in teaching process. It examined 246 students on the second of bachelor studies (course Urban Structure) and 30 students on the third year of bachelor studies (course Studio Project 4). Their competencies are compared at the beginning and at the end of the courses, by the questionnaire compiled.

Course Urban structure

Course named Urban structure represents a focus, i.e. strategic centre according to EU REGIONAL CLIMATE CHANGE ADAPTATION KNOWLEDGE PLATFORM (EDUCATE 2012). The course covers a functional approach that includes diagnosis, proposals, implementation and evaluation of effects.

In general, the environmental problems related to urban settlements and climate change could be better observed by introducing the critical approach to education of architects and planners. This approach introduces the basic factors of urban structure to the students (the basic methods and techniques of analysis and planning of spatial organization). It also allows the critical observation of actions conducted by users in a selected area (so-called "autonomous adaptation"). As a result, students formulate suggestions for users' activities, as well as the guidelines for land use in the form of sketches, diagrams, drawings and text, as a manual for climate change adaptation and environmentally-friendly development.

The environmental problems, caused by the climate change and low level of environmental awareness, are intuitively related to space by students, using observation and analysis, but also establishing goals/criteria which would guide users during the adaptation of urban structure and mitigation of negative environmental effects. This process is observed in the context of experiences and constraints in developing countries (Sanchez Rodriguez, R., 2011). In order to establish relationships, it is necessary to have a holistic approach, realized through Generative Learning (Argyris, Schon, 1978; Nonake, 1995). Consequently, the cognitive process in this course was divided into four parts, considering the city as a living organism:

- Anamnesis (history of the problem) - the elements of the selected site, obtained through observation and data collection. Students find and present the facts about urban structure, by using maps, parameters and indicators about construction, built environment and microclimate. They observe, collect and edit data through four aspects: urban spaces, stakeholders, activities and climatic influences.
- Examination - the site is considered in relation to environmental threats and climate change, defining the interdependence between ecological parameters and urban structure. Students recognize the trends that influence the increase in climate and environmental hazards

(changes in land use, urbanization, green and water areas, roads, etc.).

- **Diagnosis:** assessment of potential, vulnerability and weaknesses based on data obtained through the survey of the site. Students observe the dominant conflicts in urban space and identify the interests that stand behind them. The quality of urban structure is compared to established standards.
- **Therapy:** specific proposals defined in order to overcome the problems of urban structure in the detected environmental context. In the form of practical and technical manuals with sketches, the instruction for adaptation of urban structure according to the new conditions is finally given.

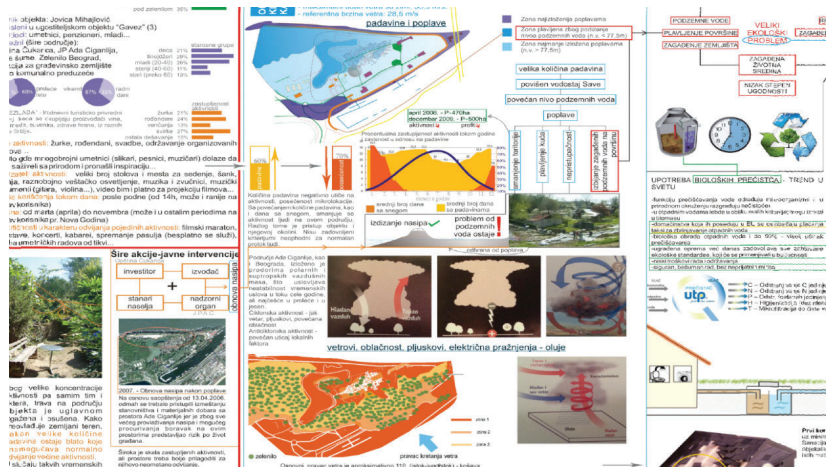


Figure 3: Semestral work of student Maja Vasilev, according to the framework of research on the course: anamnesis, examination, problem diagnosis and therapy on Ada Ciganlija site in Belgrade, Serbia

Course Studio Project 4

Studio Project 4 is centrally positioned in the curriculum the third - final year of Bachelor studies at the Faculty of Architecture, University of Belgrade. The Studio is conceived as a course in which students actively use their up-to-date knowledge, providing answers and solution in line with the imperatives of sustainability, resilience and environmental awareness, i.e. climate change adaptation and mitigation by applying integrated architectural and urban design. The curriculum of the course represents a symbiosis of theory, research and praxis, simultaneously targeting the areas of architecture, urbanism, ecology and technology. During the year 2012/13, the project brief of the studio conducted by Professor Zoran Nikezic and Aleksandra Stupar, was directed toward the future development of Belgrade and the selected area of Bara Venecija.

The final results of this experiment were (re)presented in the form of new resilient models of urban structure, situated on the river bank. The proposed topics included – natural and built local conditions, city vs. water, density vs. green architecture, culture and sustainability. Given that the main task of the design brief was to define instruments of urban design related to adaptation, mitigation and overall sustainability, it was necessary to understand and adopt multidimensional properties of a city, as a part of dynamic complex system in constant interaction

5th INTERNATIONAL ACADEMIC CONFERENCE

with its direct and indirect environment. The design brief also demanded holistic approach to urban planning and design i.e. functional, social, disciplinary, and professional re-integration that favors experience based design, its dynamism and flexibility.

Educational process was conducted according to the methodology of Experiential Learning (Kolb, 1984) conducted in four successive phases. During the first phase students were focused on the research of experiences in the field of “green” architectural and urban design. They analyzed the selected case studies, experimental models of housing and urban transformations, getting familiar with the latest concepts dealing with ecological problems and testing the effects of recent urban interventions.

The second phase of the studio work was dealing with on-field research, including the existing spatial and functional context, ecological characteristics and technological possibilities. The students were divided in several groups which visited the area and collected all relevant data regarding the topic. According to these information and established criteria, the selected area was evaluated, and main development problems and potentials were identified.

The third phase was to define general development and design strategies based on the elements which were obtained during the survey of suggested topics- natural and artificial environment, the relationship of the city and water, culture and sustainability, as well as the relationship between density and urban greenery. Initial concepts were created in accordance with the selected ecological imperatives. During the work on the project, the students also become familiar with a rational consideration of new urban needs. It was necessary to correlate the parameters of development, such as compactness and density, with the performances of the ecosystem. At the end of this phase students adopt a specific model of development as a context for their architectural/urban design.

In the final phase of the study, students were dealing with architectural design of the selected segments of urban space checking the principles of adaptation, mitigation and environmental awareness by implementing “green” standards.



Figure 5: The semestral work of students Milijana Zivanovic i Marko Radosavljevic, according to the research framework of Studio Project 4: studying the experiences; on-field research;

defining general development and design strategy by implementing “green” standards in Bara Venecija, Belgrade, Serbia.

Concluding remarks

The purpose of this paper was to consider possible approaches of architectural/planning education adjusted to the latest environmental priorities, formulated in agendas of referential institutions – RTPI, EDUCATE – Framework for Curriculum Development Environmental Design in University Curricula and Architectural Training in Europe. The problems of competences, as well as the balance between acquired knowledge and experiential knowledge were tested within two course curricula on the Bachelor level - Urban structure and Studio project 4, revealing the higher level of innovativeness and creativity caused by the students' knowledge based on alternative theoretical assumptions (Problem Based Learning, Action Learning, Anticipatory, Tacit, and Interactive Learning). Additionally, one of key findings related to Problem Based Learning is the fact that students need to face a problem which they have to understand completely because that motivates them to disclose relevant knowledge, without pre-determined models/recipes. Therefore, this approach can provide a more powerful experience than the application of abstract knowledge. However, there is still a dilemma related to the proper timing of the detection of a certain problem - should it be before, after, or during the process of acquiring knowledge about the site? A good research question, raised in the proper moment, is of crucial importance for students, helping them to shape their opinions on the topics of adaptation, mitigation and overall resilience of urban structure. Simultaneously, the special value of the applied methods is represented by innovative, problem-oriented work resulting in specific proposals and the ground rules for design and land use, without the use of recipes and prescribed solutions.

Acknowledgement: The article is realized as part of the project “Studying climate change and its influence on the environment: impacts, adaptation and mitigation” (43007) financed by the Ministry of Education and Science of the Republic of Serbia within the framework of integrated and interdisciplinary research for the period 2011-2018.

References

- Alizadeh, T., Tomerini, D., & Colbran, S. (2017). Teaching Planning Studios: An Online Assessment Task to Enhance the First Year Experience. *Journal of Planning Education and Research*, 37(2), 234–245.
<http://doi.org/10.1177/0739456X16647162>
- Belinda Yuen & Leon Kong (2011): *Cities and Climate Change: Responding to an Urgent Agenda*. Washington DC: World Bank
- Climate Change Adaptation: Supporting communities in making tangible changes. ICLEI Europe <http://>