

Embracing The Green Curricula? The New European Bauhaus as a Driver of Environmental Change in the University Education

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Abstract

The education of future urban planners and architect has been exposed to various global trends which influence our environment. Nowadays, the imperatives embedded into the 2030 Agenda, the European Green Agenda and the New European Bauhaus (NEB) represent a starting point for the preferred green transition which should contribute to the sustainable urban future. The University of Belgrade - Faculty of Architecture has been strengthening the environmental dimension on all levels of studies, and this paper will focus on the case of the Master program in Architecture - Module Urbanism. The thematic and structural modifications will be discussed on the level of three courses - Sustainable City (obligatory), Ecopolis (elective) and the final/graduation work (Thematic research, Master Thesis, Master Project studio), also considering their results and public outreach.

Keywords: education, green transition, urban planning, architecture, Green Agenda, New European Bauhaus.

1 Introduction

The context of the contemporary life strongly affects our living environment, especially cities, as the major hubs of interaction, innovation and exchange. Urban nodes have always represented a spatial reflexion of our needs and aspirations, but also a setting in which emerging problems and conflicts have been displayed. Consequently, the importance of cities in the loop of socio-economic, technological and ecological changes has always been emphasised, while the role of urban planning and design, as well as architecture, has been recognised, tested, praised or criticised. In order to meet the latest challenges, some efforts have been made to create a solid global framework of action, synchronised with the 2030 Agenda for Sustainable Development and its goals (UN, 2015). On the European level, three documents were adopted in 2020: the New European Bauhaus (NEB), the Green Deal - a vision of Europe as the first climate-neutral continent (EU, 2020a) and the New Leipzig Charter - the broadest European policy for sustainable urban development (EU, 2020b).

The NEB initiative revolves around urban settlements, as the main generators of both global difficulties and solutions, while SDG 11 represents its starting point for building a resilient society. Based on the premises of new working possibilities, safe and affordable housing, efficient public transportation and green public spaces, the NEB program also underlines the principles of inclusiveness and participation (NEB, 2021). All these postulates are of crucial importance for the future generations of planners and architects and have to be included into the education process in order to ensure understanding and appropriate (re)action when facing urban reality and the accelerated dynamic of its change. Therefore, universities have had to strengthen their role in the environmental transition directed by the SDGs and the NEB objectives and intensify their application in the teaching process. The up-to-date models of learning have been introduced in order to ensure the harmonisation of the latest ecological trends, the adopted international declarations, ongoing research and professional practice.

In line with these activities and imperatives, the University of Belgrade - Faculty of Architecture has introduced a set of curricula modifications during the latest accreditation cycle (finalised in 2021/22), verified by both the National Entity for Accreditation and Quality Assurance in Higher Education (NEAQA) and the Royal Institute of British Architects (RIBA). Based on the 2030 SDGs and the NEB agenda, these changes contribute to the anticipated ecological transition of both the planning and architectural profession and have been positively validated by students, educators and practitioners.

In order to provide a better insight into these program changes, the paper will consider the development and application of three green-driven curricula for the courses conducted within the Master program in Architecture - Module Urbanism: Sustainable City (obligatory), Ecopolis (elective) and the final/graduation work (Thematic research, Master Thesis, Master Project studio). The link between their content, global environmental agendas and the EU frameworks of/for sustainability will be established, while providing an insight into the results of their pedagogical process and public outreach.

2 New European Bauhaus vs. Educational Paradigms

Since 2018 and the adoption of the Davos Declaration, the environmental discourse of building and constructions has been gradually incorporated in many EU documents, as a signpost for the protection of our habitats. Due to this shift, the importance of architectural and planning profession was stressed, causing further changes in the strategical thinking focused on the sustainability and resilience of our future. The NEB initiative, essentially conceptualised as a culture-oriented EU policy, also follows this direction via the lenses of architecture and urbanism, merging the themes of sustainable development, aesthetics and inclusiveness. The prerogatives of multileveled integrative approach are considered within the social, ecological and technological spheres of future actions focused on the problems of intensified climate extremes, degraded environment and the consequences of COVID-19 (NEB, 2021).

Although the necessity to incorporate environmental imperatives into university curricula has already been addressed by various pedagogical initiatives since the mid 1960s, the rigid frameworks of inherited pedagogical approaches have frequently represented a serious obstacle to the updating of educational content and methodologies (Salama, 2009). Consequently, the planning and architectural schools have had to innovate their outdated programs, providing knowledge and skills adjusted to the needs of both the society and the profession, while continuously evaluating their real impact on society, space and overall sustainable development.

During the last 60 years, universities have been discussing and practicing various models of critical thinking in order to tackle a wide spectrum of ecological and social problems - from the New Design Pedagogy (mid 1960s - late 1990s), which focused on sustainable urban communities through the application of case studies, community-based design and participative curriculum models, over the impact of architectural education on society, urban/architectural space and its transformations (Beinart, 1981; Dutton et al., 1991; Crinson and Lubbock, 1994), to the role of architectural education for international practice/global exchange (Teymur, 1992) and the innovative methods used in design studios (Salama, 1995). The next period (mid 1990s - mid 2010s) was marked by the approaches related to the Critical inquiry and the Process-oriented design pedagogy (Salama, 2016), emphasising the role of flexible, integrated and evidence-based curriculum directed to contemporary problems and professional challenges (Boyer and Mitgang, 1996; Pilling and Nicol, 2000; Harriss and Widder, 2014). During the 2020s, the university programs were updated through the implementation of the

Interchangeable design pedagogies, the Community based design pedagogy and live project studios, also stimulated by the NEB platform (2021). All these steps, additionally supported by the latest digital tools, lead toward environmentally driven practice, based on global imperatives, inventive solutions and emerging theoretical frameworks.

3 Channelling the Action

The multiplying problems in/of our living environment, especially those concentrated or triggered by urban setting, have been thoroughly studied since the late 1980s, when the concept of sustainability was defined. Nowadays, the idea of sustainability is often accompanied by the concept of resilience, while their iterations and interpretations are included into contemporary theory and practice, strategies, policies and action frameworks. The NEB platform, as a specific stimulus for environmental transition, is also based on the ideas of sustainability and resilience, addressing them in an integrated manner, embraced by the schools of planning and architecture. On the theoretical level, the notion of sustainable development has been modified under the influence of the resilience theory (Holling, 2001; Folke et al., 2010; McPhearson, 2015), while its application in the sphere of urban systems has been gradually redefined, in accordance with their complex nature and the unpredictability of external influences. In line with this, the university programs have included the studies of many complementing, environmentally-driven concepts and principles - e.g. circular economy, green infrastructure or energy efficiency - which directly or indirectly address problems of cities, as the major nodes of global exchange and the unique testing grounds for innovative ideas oriented toward general well-being, economic growth and environmental quality. Since their importance has been recognised by various documents, their application could be considered as a necessity in the domain of spatial intervention and societal changes. Consequently, the actions highlighted by OECD (2020) instruct professionals to Rethink (stimulate local communities and raise their awareness), Regenerate (by increasing green infrastructure), Reduce (via strategies focused on resource footprint reduction), Reuse (by establishing sharing platforms) and Recover (resources and landfills). The application of these steps in education programs (and in practice) is usually directed to local public services (e.g. transport, waste, water and energy systems), while their real impact should be readable in the anticipated regeneration of natural environment.

The role of green infrastructure has also been tackled by a number of the EU documents and strategies anticipating a new development vision for the networks of natural and semi-natural areas. Able to provide ecosystem services and enhance biodiversity, green infrastructure, and its multi-scalar effect on space, stimulate social and territorial cohesion, sustainable development and overall human well-being (EU Commission, 2013; Simić et al., 2017). Therefore, its design should be considered in the process of architectural and urban conceptualisation and the introduction of upgraded typologies.

In line with these emphasised features and concepts, the NEB framework highlights their impact on built environment through the processes of co-creation, inclusion and cohesion, as well as three main pillars - design, delivery and dissemination. The interdisciplinary approach is favoured, while planners and architects should ensure the spatial manifestation of sustainability and resilience, also addressing the imperatives related to the sense of belonging, accessibility (both physical and digital), circularity, affordability and zero pollution (EU, 2022).

4 Introducing the Change, Implementing the Curricula

With the tradition of over 170 years, the education of architects and urban planners at the University of Belgrade - Faculty of Architecture has always been influenced by the unique context of Belgrade, the capital of Serbia and ex-Yugoslavia, an important node in Southeast

Europe. The current studies conducted at the Faculty are based on an integrated approach implemented by four departments (Architecture, Urbanism, Architectural Technologies, and History and Theory of Architecture and Art), providing a wide scope of knowledge and practical skills derived from technical and technological sciences, arts and humanities and social sciences. One of provided Master programs - Master studies in Architecture, consists of four modules (Architecture, Urbanism, Architectural Technology, Structural Engineering), all leading to the Master of Architecture title (M.Arch, with a reference to a selected module), also validated for RIBA Part 2 Status (since 2015).

The structure of studies is composed of several study units - Studios (design project, seminar), Module compulsory courses, Elective courses and Theoretical discourse (provided by all departments), Common compulsory courses (sociology/philosophy/economy) and Master diploma project (consisting of Thematic research, Master thesis, Master design and Master final project) and all of them integrate the NEB framework.

In the module Master in Architecture_Urbanism, entitled Sustainable City, both the theoretical/research-oriented courses and the design-studio underline connections between people and built environment while considering a number of topics related to sustainable and resilient development. The courses and studios are problem-based, facilitating the understanding of natural and socio-spatial phenomena, spatial typologies, processes and policies. The courses presented in the paper follow the same framework, although they belong to three different modes of educational curricula. The compulsory course Sustainable City 1 - Transformations is located in the first semester, Ecopolis is an elective course positioned in the second semester, while the Master diploma project is positioned in the fourth semester.

The first two courses are theoretical and research/project based, while the third one combines these approaches with the design-driven method in different phases. Due to the project orientation, the active participation of students is enabled, tackling a variety of location-specific problems through the experimental and innovative game-based curriculum (Chen and Hoffman, 2017) and the reflexive thinking and journaling (Kelly, 2006, 2010). Simultaneously, all three curricula apply predictive learning and future design while estimating the environmental impact of anticipated/planned changes.

Sustainable City 1 - Transformations represents a course which enlightens the trajectories of urban transformations used as the main stimuli of urban development. Conducted by Associate Professor Dr. Vladimir Mihajlov and Assistant Professor Dr. Ivan Simić, it considers the process of adaptation leading toward a sustainable urban future, as well as the contributing premisses. During the course, the importance and effects of SDGs and the NEB postulates are continuously emphasised, especially the topics of green urban transformation. Consequently, students are directed to critically perceive origins and effects of occurring problems, apply theoretical knowledge on urban design and the conceptualisation of urban communities, while considering planning policies and legislation influencing a final result. The course also introduces the relevant models of sustainable cities and lifestyles, greening strategies, resilient urban practices, as well as the use of sustainable materials. The curriculum is structured around ex-cathedra lectures, students' research (group work) and a pilot project proposal.

In line with the integral, multidisciplinary approach promoted by the NEB, the lectures include presentations of experts from various fields (e.g. landscape ecology, urbanism, biology, hydrology, geology, transportation, social sciences etc.), elucidating their professional insights. Students focus on different phenomena discussed by groups through a critical-argumentative

debates, and the course outcome is defined as a Civil Initiative Project Proposal. It is developed in a format which could be applicable for different funding options, potentially leading to the improvement of selected urban environments through the implementation of public innovations, tactical urbanism or business-driven sustainable solutions. The final assessment is based on the NEB criteria.

The inspiring example of this practice was implemented through the participation of Marina Papović, the operation development manager in CirEkon, who held two lectures on the application of circular economy in building process, emphasising several elements:

- the growing awareness related to the use of circularity,
- the need for a holistic approach to circularity in architecture,
- the focus on the process of recycling and circular economy during the design of buildings,
- the presence of inadequate product standardisation as a drawback for the transition into circular economy,
- consideration of building optimisation and the operational aspects of circular economy.

These lectures had two successful educational impacts. The first one was the participation of student teams in the 2021 CirEkon and EIT Food Competition for Engaging Citizens in Circular Economy, where one of the teams won the 1st award (Figure 1), while the second one was a workshop during the 2022 Balkans Go Circular international conference, where the most important experts in the field of circular economy presented various solutions for the regional and global challenges (Figure 2).



Figure 1: The project proposal for improving the sustainability of urban environment in Pancevo (Students: Emilija Drndarski and Sara Brkić. Supervisor: Associate Professor Dr. Vladimir Mihajlov) - 1st award at the 2021 CirEkon and EIT Food Competition for Engaging Citizens in Circular Economy.

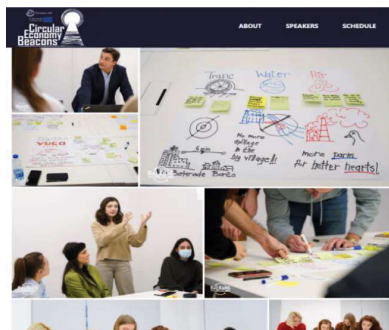


Figure 2: The workshop Balkans Go Circular: The database support to the Civil Initiative Project Proposals, organised by the EIT Climate KIC and CirEkon d.o.o. (Serbian Chamber of Commerce, 2022). The participants were students from the course Sustainable City (Source: <https://circular-beacons.net/wrapping-up-the-year-with-balkans-go-circular-conference/>)

The curriculum of the course **Ecopolis** encompasses diverse aspects of the ecological resilience of cities, their urban design, planning, adaptation and mitigation by introducing the contemporary ecological concepts of urban resilience which have significantly changed urban theory and practice over the last few decades. The students also learn about the vital role of green infrastructure in creating resilient urban environments, focusing on nature-based solutions (NBS) and addressing social, economic, and ecological challenges effectively. The analysis of the selected NBS projects, particularly those recognised as the finalists of the "Reconnection With Nature" category of the NEB Awards, enables students to gain an insight into the integration of natural, social and built components. Additionally, the course emphasises the role of biophilic design, circular economy and urban recycling, as well as the adaptive reuse of buildings, shifting the focus toward the efficient utilisation of resources and encouraging innovative design approaches to new purposes. The second part of the course is directed toward the application of presented models and strategies across the selected case studies in Belgrade or other Serbian cities.

The case selected for the 2024 spring semester is the area of Reva wetlands on the left bank of the river Danube, in the central Belgrade municipality of Palilula. This area is exceptionally important due to the wet habitats and marsh ecosystems created along the left bank of the river, on its course through Belgrade (Figure 3). Their role is multiple - in addition to being part of the flood protection system, these areas have rich biodiversity and a number of protected species of amphibians and birds. There are three nests of the white-tailed eagles in the area, representing an exceptional value for the urban ecosystem. In the context of climate change, this type of area could be considered as a carbon sink.



Figure 3: Bara Reva wetland (Source: Authors)

Due to the specificities of the curriculum and the selected case study, the teaching methodology of this course is also based on interdisciplinarity and the engagement of various actors - visiting scholars and practitioners (biologists, hydrologists, climatologists etc.), participating in both the theoretical and the applicative segment. The various local stakeholders, living and working in the area, or actively engaged in nature conservation, also play an important role. Consequently, the main local stakeholder is the White Heron association, which brings together the local residents from the settlements located in the hinterland of the Reva wetland and the banks of the Danube. Being actively engaged in protecting this area from excessive and unplanned urbanisation, they represent the most important source of information on the area and its problems. The association presented the genesis of settlements on the left bank of the Danube, mapped important spatial determinants during a workshop (Figure 4) and provided an insight into their vision of development - the Danube Park. This project envisages the rehabilitation of the Reva reservoir and the introduction of various contents - such as the Danube Park building, a network of pedestrian paths, a bird observatory, but also a cycling infrastructure as a part of the international routes Eurovelo 7 and 11, passing through this area. The students critically considered the proposed program of activities for the Danube Park, which was the starting point for their intervention proposals.



Figure 4: Meeting with the members of the local association White Heron (Source: Authors)

The theoretical part of the course provided basic theoretical principles of urban ecology and its links to urban design. The experts from various fields were invited as guest lecturers, while some of them also participated in several workshops with students, supporting their research and project ideas. One of them highlighted the role of nature based solutions in flood management (Dr. Ratko Bajčetić, Faculty of Environmental Management in Novi Sad) and contributed to the design phase of the Master plan of the Reva wetland. Additionally, the workshop held by Dr. Tanja Vukov and her colleagues from the Institute for Biological Research, opened the topics of mapping and description of the wetlands system in the case area (the boundaries of habitats, plant and animal species, zones of human intervention), supporting the further process of environmentally acceptable planning and design (Figure 5).

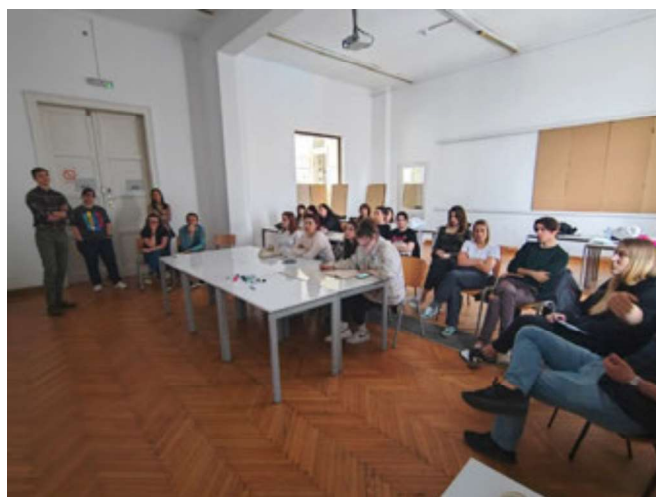


Figure 5: Workshop with the biologists from the Institute of Biological Research (Source: Authors)

The final step of the education process conducted during the program Master in Architecture Urbanism represents a set of courses within the **Master diploma project**. The main idea of its complex task is to summarise the knowledge obtained during four semesters while applying various methods of research, formulation, conceptualisation, design and materialisation on a comprehensive urban and architectural program. The work during Thematic research, Master thesis, Master design and Master final project is individual, although supported by a mentoring committee and a supervisor, while the general framework and the focus area are predefined on the level of each studio. In line with the sustainability imperatives of the whole program, the objectives embedded in the NEB initiative are integrated into a thematic scope and further developed by students/candidates.

The example of the studio entitled NS 2030: ECO-HORIZONS (supervised by Professor Dr. Aleksandra Stupar in 2021/22) demonstrates this practice on several levels, simultaneously triggering environmental, social and technological manifestations of sustainable and resilient transformations. The students initiated the process by studying selected themes related to urban regeneration, industrial archeology, regenerative architecture, climate adaptation, flexible space or nature based solutions. The concepts of circular economy and energy transition were also taken into consideration, along with more specific themes (e.g. the integration of animals and insects into living and working environment). After the thematic research, their thesis used the general framework/topic as an initiator of both further research on the proposed site and the preferred concept of transformation, highlighting the identified urban phenomena, analysing representative cases, and finally defining a program for a project. The course is concluded by a public defence, which elaborates a concept, regulation and design of an urban area and its specific content.

The studio used a part of the industrial zone of Novi Sad as a polygon for intervention, focusing on the abandoned site of Agrohem, a fertiliser manufacturer, previously exposed to a significant pollution. The site is situated at the city entrance, nearby the connection of the Danube River and the Danube-Tisa-Danube canal. Taking into consideration the SDGs and the NEB principles, the anticipated transformation was also guided by the ideas of the Gaia hypothesis, supporting the setting of a new sustainable node, based on the active use of recycling, innovative business models and activities, green regeneration through biophilia and the reduction of carbon footprint.

The park of ecological and psychological renewal_biophilic design, by Milica Brajović, is a project driven by biophilia on all levels, merging the context, natural cycles and existential principles in order to regenerate the site, preserve resources and develop environmental awareness (Figure 6). The community cohesion is supported by the introduced activities, ensuring integration, increasing the interest for natural environment and, consequently, contributing to the sustainability of a created mini-ecosystem. The phases of the implementation are also planned in line with the imperatives of economic, social and environmental sustainability. This project later received the prize of the 2022 International Urban Planner Exhibition of Serbia (student category) and the annual award 'Milorad Macura', granted by the Institute for Architecture and Urbanism of Serbia for the best master diploma project in architecture (2023).



Figure 6: NS 2030: ECO-HORIZONS. The park of ecological and psychological renewal_biophilic design (Student: Milica Brajović. Supervisor: Professor Dr. Aleksandra Stupar)

The general framework of the ongoing Master studio project (also supervised by Professor Dr. Aleksandra Stupar, 2023/2024) uses the elements of the same environmental paradigm, included in the NEB agenda. Entitled Vista Alegre: The Kaleidoscope of Urban Innovation, the studio continues to explore the broad spectre of innovation - spatial, social and technological, highly integrated with ecological principles. During the Thematic research, students explored the general topics of sustainable transformations, focusing on more specific aspects according to their preferences - from urban regeneration, climate adaptation and alternative energy integration, to biophilic and biomimetic design. Due to project location being in Madrid, the students had several online workshops with local experts and guest professor Dr. Manuel Collado Arpia, discussing their research. The selected aspects and phenomena were developed in their theses, shaping the specificities of future project programs adjusted to the local context.

The selected area of Vista Alegre, within the Carabanchel district of Madrid, provided an interesting polygon due to its history dating back to the 18th century, when it appears in plans as a rural estate. Since then, the character, activities and ownership of the space have been transformed several times, leading to a state-owned, fragmented area, with multiple activities related to health, education, institutional services, as well as a botanical garden and public green spaces. Bearing in mind the unique physical, functional and natural characteristics, as well as the recognisability of this unit and its environmental potential, possible interventions could stimulate its opening toward the city, while respecting its inherited historical and social values. Based on the 2030 UN SDG goals and the current paradigms of resilient, eco, creative and healthy city - a city of well-being open to all - the possible interventions could target the landscape, public spaces and built fabric, a total or partial transformation and regeneration, as well as the (re)consideration of continuity and discontinuity.

Among the programs formulated within the theses - highlighting the concepts of learning cities, regenerative healing spaces, biophilic/nature inspired design, urban acupuncture and local

community activism - the project entitled Vista Alegre: Resilient ConnectScape (by Tamara Mladenović) could be distinguished as an inventive approach to urban resilience through socio-spatial defragmentation and connectivity. Inspired by the concepts of integral urbanism and the idea of learning from nature, the socio-ecological diversity is explored in order to enhance urban system resilience to various challenges. Examining the related theories and boundary perception, the complexity of urban space is determined, as well as the main problems and potentials. The project focuses on the development of a new social centre and a Resilient Hub, supporting long-term sustainability and adaptability, while instigating social cohesion. With an innovative combination of content and spatial units, relying on the natural elements of the site, the project aims to achieve a comprehensive resilience of the area and its neighbourhood (Figure 7).



Figure 7: Vista Alegre: Resilient ConnectScape (Student: Tamara Mladenović. Supervisor: Professor Dr. Aleksandra Stupar)

5 Conclusion

The presented courses support the ideas included into the 2030 SDGs and the NEB initiative, creating a stimulating learning environment focused on the occurring contradictions and uncertainties of contemporary urban life. The general ideas of sustainability and resilience are

tested on different spatial levels and scales, instigating the interaction between society, space and technology and potentially contributing to the increased environmental awareness of all involved stakeholders while increasing the general wellbeing.

The continuous upgrading and modernisation of university curricula is a necessity in a hyper-dynamic world, in which planners and architects could have an important role in transmitting the ideas of sustainability. The green transition should not be included only in the catchy titles of design courses but studied on both the theoretical and practical level, influencing the generations of future professionals whose ideas will shape urban reality in the years to come. At the same time, introducing the most recent topics and paradigms stimulated by the NEB ideas, global and local strategies and up-to-date visions and projects, certainly has an impact on the students' perception of emerging problems, the conceptualisation and evaluation of proposed solutions and the personal and collective responsibilities. Directing a path to eco-friendly actions, the master program Sustainable City highlights the key features of environmental change. Therefore, it could be also seen as a unique medium of networking, interchange and integration, providing a fertile ground for a crossover between the formal and informal flows of knowledge, supported by multidisciplinary experts and open to local specificities.

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