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## RESEARCH BY DESIGN – FOSTERING STUDENTS’ CREATIVITY BY IMPLEMENTATION OF WORKSHOPS IN ARCHITECTURAL EDUCATION

### *Abstract*

Social, cultural, and economic aspects of contemporary architecture emerge in a variety of architectural and artistic works, together with theoretical and experimental research, which leads us to the rethinking of traditional teaching methods. This paper examines the possibilities of new formats for teaching architecture, which are relevant and attractive to students and could bring new approaches to education. This article describes the implementation of the “research by design” method of teaching architecture based on different multimedia projects. The new approach to teaching design should stimulate creative processes that could guide students to develop their creative skills by choosing their medium of expression following personal character and sensibility.

*Keywords: architecture, design, research by design, teaching, higher education*

## ИСТРАЖИВАЊЕ КРОЗ ДИЗАЈН - САВРЕМЕНИ АРХИТЕКТОНСКИ СТИЛОВИ УЧЕЊА

### *Сажетак*

Друштвени, културни и економски аспекти савремене архитектуре доводе до појаве мноштва архитектонских и умјетничких дјела, заједно са теоријским и експерименталним истраживањима, што нас доводи до преиспитивања традиционалних метода наставе. Овај рад испитује могућности нових формата за наставу архитектуре, који су релевантни и привлачни за студенте, а који би могли да донесу нове приступе у образовању у цјелини. На неколико примјера различитих пројеката, приказана је имплементација методе "истраживање кроз дизајн" засноване на различитим мултимедијалним пројектима у оквиру редовне наставе на основним студијама архитектуре. Нови приступ дизајну наставе требало би да стимулише креативне процесе који би могли да наводе студенте да развију своје креативне вјештине избором сопственог медијума изражавања у складу са личним карактером и сензибилитетом.

*Кључне ријечи: архитектура, дизајн, истраживање кроз дизајн, настава, високо образовање*

## 1. INTRODUCTION

Contemporary social context in which architects live and work demands a change of classical principles of education in architecture. The new social and cultural frames, as well as the fast technological development, represent the field that opens the possibilities for a broad spectrum of architectural practices, at the same time requiring different approaches in problem solving within architecture, and an examination of multi-layered character of the solutions. In these circumstances, teaching in the field of architecture is faced with dilemmas about the ways in which it is possible to establish new methods of work with students and introduce new formats of research in the domain of creative disciplines. Without a doubt, a special attention must be given to the simultaneous knowledge acquisition and development of original ideas through the teaching process in the courses where creativity is one of the most important elements for finding the solutions to the given problems. Numerous authors agree on the importance of the applied methods in the educational process in architecture, pointing out the significance of the education itself and stating different ways of stimulation of creativity in students [1, 2], along with the dilemma on the possibilities for changes that might be made to the discipline of design education and their effects within the higher education system [3].

Regardless of the curriculum of architectural studies, there is a common stance that in architectural education the main objective is to help students, especially first-year students, to improve their design ideas, creativity, perception of three dimensions and ways of expressing them [4]. However, the individual syllabuses provide teachers with possibility to select some specific formats in accordance with their own ideas, understandings, and work methods, which will support the students' development of creativity and thinking. Therefore, when defining the syllabus, one should take into consideration that "creative learning relies on experiential, often intuitive, contextualized judgements which are applied to complex, heuristic tasks- whether for internal or external verification" [5]. It is undoubtedly that contemporary teaching of architecture and work with students should be conducted through a diversified and non-manipulative discourse on all levels of architectural work, and numerous educational and research processes. This approach is confirmed by the opinions of the authors who claimed that the change in design education should be addressed in the context of a newer paradigm based on the recent development of complexity theory. Such changes would include rethinking the epistemology of design, becoming more aware of the systematic processes of design, and incorporating multidisciplinary approaches to design projects and activities [3].

The advantage of this approach in teaching architecture is recognized at the Department of Architecture and Urbanism of the Faculty of Technical Sciences in Novi Sad, allowing working with students to be defined in accordance with current topics in the field and adaptable to modern teaching methods. Such modifications compared to the usual way of working with architecture students are covered by a global project common to the entire Department, which includes improvements in teaching as well as in the scientific and artistic segments of work. In this sense, the general objectives and outcomes of each specific course that is accredited within the study program could be precisely defined each year, followed by the methodological procedure chosen with an aim to achieve the desired learning outcomes. In this regard, each teacher can develop a workshop within the course in accordance with the syllabus. All the three students' workshops presented in this paper were part of the teaching process and represent the way in which students went through the learning process by exploring the given topic and then providing their own view of the problem, followed by several presentation steps and their own architectural representations throughout the semester and in the final exhibiting event. Each year, the process is adapted to the new generation and current global topics and trends in architecture, so that students also have a sense of belonging to contemporary architectural practice as well.

Thus, this article represents the way in which the new approach in teaching of design has been implemented, though a multimedia student projects at the first year of architectural and scene design studies. The method "research by design" represents a broader concept that involves both "research through practice" and "research about practice". Through this educational approach, students of architecture worked on developing their competences and creativity through a direct contact and cooperation with their peers. They were free to choose their own way of expression in accordance with their personal character and sensibility through an interdisciplinary approach to the spatial design.

## 2. CONTEMPORARY APPROACH IN TEACHING ARCHITECTURE – “RESEARCH BY DESIGN”

The introduction of new methods and formats in the tuition of architecture, presents the lecturers with a sensitive question of the approach to students and development of their creativity, which is a “tangible thing”, easily identified and quantified [1]. Starting from the fact that contemporary architecture is not only the building practice, but also a creative process that interlaces theoretical and practical work, the research in this discipline is to provoke several dilemmas and solutions, which need to be articulated and applied. The various changes brought about by the 21<sup>st</sup> century determined a multimedia character of this discipline and influenced a reassessment of the existing educational processes. The approach to the teaching of architecture which will no longer be oriented exclusively towards the creativity itself that we are teaching or demonstrating, “but rather the ways in which the creative process or creation of works may be fostered through a range of acts, discussions, explorations and exposure to new ideas” [1, p. 153], stands for the contemporary context in which the curricula are developed. The acceptance of complexity theory in the education in architecture, should transform student projects from the simple problem solving one to “an open-ended process of discovery yielded by assuming the educational process as a whole with creatively emergent potentialities” [3, p. 178]. This enables an architectural education where learning is a continuous process in which knowledge is generated through a transformation of the experience [6]. Following the recommendations on the qualities of higher education given by the relevant institutions (European Association for Quality Assurance in Higher Education – EAQUA, European University Association - EUA) and the results of the research on learning styles in architecture [7], a method of “research by design” has been introduced, besides the classical methods of teaching in architecture, in the courses at the first year of undergraduate studies of architecture at the Faculty of Technical Sciences, University of Novi Sad. This new method has an important role in the work with students and includes any kind of inquiry in which the architectural design process opens the possibilities for new experiences, knowledge, practices, or products, generating a critical inquiry through the design work. This concept of teaching also encompasses a theoretical framework, which is necessary for the realization of tasks and reaching the aimed educational outcomes. The emphasis is on the active and experiential learning, cooperation, and interactive instruction. Starting from the socio-cultural demands of the architectural practice, this coursework provides students with a multidisciplinary approach and an insight into the possibilities of a non-traditional exploration within the architectural design.

This active exploration within the teaching process which is entirely empirical is increasingly becoming the subject of contemporary research and architectural and scientific criticism, which examine its relevance and scientific character, thus confirming the needs for contemporary design education to aim at “enabling students to identify their own areas of interest and to develop understanding and skills particular to design” [4]. The students explore and explain the problem through a dynamic interaction, thus gaining the knowledge through their own experience. Through this format of work, they are enabled to gain the knowledge both by theoretical research and learning, as well as through getting familiar with the architectural practice. The active learning is based on the students’ personal experiences, through which they develop an understanding of the surroundings, and on the new knowledge, which provides a progress in their competences. The pedagogical benefits of active learning are based on its intellectual stimulation which maintains the motivation and the interest through the development of the many skills necessary for organization of activities, interaction, and communication with peers, with a continuous progress and a positive attitude towards the learning subject, while following the work together and discussing the actions and strategies [8].

“Research by design” is a contemporary and nontraditional form of teaching and working in architecture, which integrates the traditional and the new elements of contemporary architectural practice and entails the existence of a theoretical framework where the research takes place. Nontraditional research forms refer to the “art-based research or practice-based research, which must be comparable to the classical scientific methods” [9, p. 9]. If architecture is seen as an artistic discipline, it becomes clear that this type of empirical research “has a label of creativity which suggests that the research itself and the researcher have to perform creativity when defining the topic, research questions, analytical methods, etc.” [10, p. 4].

The implementation of this method implies the organization of creative workshops, which are part of the teaching method, and point to the importance of the creative process for the result. Numerous experiences of learning in architecture confirm that the workshop provides a framework that enables

ideas to be explored and pass freely between participants within the studio environment, as well as the possibilities for discussion about ideas. It is confirmed that this process rises from the exchange of tacit knowledge between workshop participants, student peers and tutors [11]. The workshops are based on the tradition of the architectural studio that is derived from the “atelier system of the education of architects at the École des Beaux-Arts in nineteenth-century France” [12, p. 349]. Students in architectural studios work in proximity and the environment is intensively socialized [3, p. 176].

This way of education has been conceptualized with the aim to stimulate the cognitive development (learning in its broad meaning), from gaining and acquisition of factual knowledge to the stimulation and development of higher intellectual processes (judgement, conclusion, problem solving, etc.). The importance of group work, where the students exchange the ideas, opinions, and answers to the posed tasks through the supportive evaluation and debate, is based also on the social aspect of developing creativity in design that involves seeking and giving peer feed-back, which is integral to the creative practice of designers.

### **3. THREE DIFFERENT WORKSHOPS – ONE TEACHING METHOD**

For alteration of usual methods used in the process of teaching architecture, students were introduced to the “research by design” on the first-year course in the study programme of architecture. All three workshops were organized within the course “Introduction to Architectural Design” at the first year of bachelor studies in Architecture. The aim of this course is to develop the ability to think, observe, understand, articulate, and represent space, as well as to enhance awareness of the complexity and multidisciplinary of architecture as a discipline. Through various tasks, students are expected to broaden their perspective of architecture as a field and profession, and to familiarize themselves with the creative processes and potential outcomes of contemporary architectural practices. The course outcomes include the ability for individual and team creative exploration and expression, the capability for further and deeper study of architectural topics, and the application of acquired knowledge within other subjects. Throughout the course, students should become acquainted with the concept of architecture, the principles and forms of architectural creation, contemporary architectural practices, means and media of expression, elements of graphic, web, and stage design, as well as the relationships between architecture and events.

Each year, students within workshops were divided in smaller groups, to provide the unique and intense experience of the interactive work in the group, which holds significant didactic values and presents better learning outcomes than in the classic, ex cathedra tuition. The teacher’s role was a mediator who establish the process of interaction between the students and enable them to conduct the research, realization, and presentation of their works, individually or in small groups, without influencing the final character of the student projects with his or her authority. He presented the task- project brief, which the students are to solve by applying the previously conceptualized steps and techniques within a given timeframe and spatial delimitation, to realize their ideas. The aim of such workshops was to stimulate the participants to challenge the traditional definitions of architecture, and to examine the contemporary practice from the aspects of perception and understanding of the space. The workshop activities start with a given thematic framework, which is transformed from an abstract image into a spatial model over time, through the research on formal structures, showing how the spirit of the times together with the atmosphere of the ambience and the moment, with personal narratives and experiences can be shaped into the three-dimensional material forms. Within each below shown workshop, the assigned topic initially involved researching a specific location in the city. Subsequently, the problem was analyzed and addressed through various forms of work during the course, and finally presented again at the site itself, which was the subject of contemplation.

In this work format, it is necessary that the participants perform flexibility, willingness to change and adaptability to each new idea and situation. The task for the teacher as the mediator of the entire process is to introduce the topic and the problem in a way that provokes the students’ creative research and imaginative reaction. The principle of particularity of the topic, problem, location, timeframe, group structure, etc. can have a positive influence on both the process and the result, which does not necessarily have to be limited to the graphic and written form but should be founded on the sensory experiences. The values of such a work method are also confirmed by the pedagogical concepts of John Dewey, who stated that “learning is experiential, more a matter of exploration than of attainment” [3, p. 175].

### 3.1. “TOWARDS EU, BY THE BOULEVARD?” – RESEARCH PROJECT, WORSKOP AND THE EXHIBITION

The concept of the students' project at the first year of architectural studies, at the course “Introduction to Architectural Design”, came out of a consideration for a wider context marked by a continuous technological and technical advancement, characteristic for the beginning of the 21st century. The starting point of the project was the questioning of the traditional thinking that architectural practice encompasses solely design and building. At the same time, the processes, and ideas in the architectural practice on the global level were set as a challenge to the students of architecture, to question their ideas about the phenomenon, which was set by Aaron Betsky as a thematic framework of the 12<sup>th</sup> International Architecture Exhibition in Venice. He invited the authors from round the world to respond to the topic: “Out there: Architecture Beyond the Building”, thus examining the everlasting question of whether architecture is merely the common practice of building or also a philosophy, way of thinking, an experiment, theory, or all these together - too complex a phenomenon to offer a single answer. The project “Towards EU, by the Boulevard?” was conceptualized as a multi-layered research work, derived from the need for a deeper exploration of the limits of architecture, in which, starting from the theoretical base, the innovative research processes are developed, while the results, presented as an exhibition in a public space, were exposed and accessible to the public. The aim of the project was to, by initiation and organization of a range of events, encourage the creative process in which every student, and the spectator, can develop their individual creative abilities in the appropriate spatio-temporal context, without presumptions on the outcome of the process.

The thematic framework of the research encompassed the students' research on the problems of space, society, and politics, hence the architecture. The socio-political reality represented the context in which the students examined the questions of Serbia's accession to the EU, the future shaped by that process and decisions, along with many other topics that the students set to themselves and their peers, which were present in their works, directly or indirectly. A careful selection of the spatial context for the project realization influenced the thematic deepening of the research, consequently contributing to the complexity of the responses to the given topic. For the most significant, final activity of the course work- the public exhibition, the freight train servicing hall “Kolnica” was selected, a part of the railway marshalling station in Novi Sad, designed in 1911, which belongs to the protected architectural heritage, with the aimed future purpose as cultural institution. The entire complex is located close to the newly built Boulevard of Europe, which was conceptualized as a physical connection of Novi Sad and the European Union.

The project of experimental character was conceptualized as a workshop in which different teaching methods were applied (method of experiential learning, cooperative method, problem-focused method), during a weeklong period. On the first day, all the students were divided into 29 groups with four to six members. This method of work could be named “programme within the programme” or “work within work”, since besides enabling the work on a particular project, in this case a group spatial installation, it gives students the possibility to direct the entire exhibition, i.e. the concept of each group work influenced the flow and the form of the entire exhibition, where they developed the organizational skills alongside with the creative ones. The problem which prompted the authors to conceive the work in a different way is, in fact, an exploration and formation of a personal statement regarding the transitional period in which the country was at the moment, as well as the globalization and the processes in the context of the EU integrations.

Working on the project for a week, establishing the creative connections with the existing ambience and the surrounding space, using different technical and expressive means, within a few hours on the last day of workshop, the students realized several authentic spatial, interactive, light and auditive interventions, expressing them in different ways- by spatial installations, photos, videos, or texts. It can be concluded that the result of this project was a multi-layered, visually impressive work- provocative installations as a response to an even more provocative title. From suggestive and subtly ironic, to the comical ones, the individual works evoke the thoughts on the segment of a social and historic setting though their (non)architectonic character. Every installation examines, poses questions and provides the possible answers about the contemporary architecture, industrial heritage, and the uncertain future of the society we live in. All the works were created as an artistic practice in situ, which allowed for a closer contact with the location, the architectural form of the exhibition space, its history and future.

The individual student works, set in specific aesthetic and conceptual interrelations, were presented for the first time at the final exhibition, which was a work of art in itself. All the groups had a common spatial and thematic framework, from which they developed the different concepts as

representations of the idealized future and reflections of the public opinion. The narratives and communication of the exhibition influenced the perception and experiencing both individual works and the entire exhibition. The works of the 29 teams- the utopian visions, installations, films, and performances- represent a multimedia collage, as a range of experiments, which in an informal way examine the new methods in architectural education. The diversity of students' attempts to provide the answers to the existing space and the questions on the directions in which we are moving (in a metaphoric sense), can be labeled as nontraditional and unconventional for the common architectural practice and education. At the end of the exhibition, the student installations were evaluated by a jury, consisted of professionals from different areas of architecture and arts.



*Figure 1. The final activity of the work - the public exhibition in the "Kolnica", a part of the closed railway marshalling station in Novi Sad.*

### **3.2. ABOUT SPACE (...) POINTS EXPRESSED IN THE LANGUAGE OF ARCHITECTURE - RESEARCH PROJECT, WORSKOP, VIDEO WORK AND THE EXIBITION**

This workshop was organised within the course „Introduction to architectural design” at first year of architecture studies at the Faculty of Technical Sciences. During the study process in the semester, students went through five phases of the project. During the four months of work, using various media means: text, photography, performance, spatial model, and video, they explored the basic issues related to space, but also the language of architecture. With photographs, they marked the character of the spaces in Novi Sad, their presence in specially selected ambiances, the moments of a one-day workshop, their models as spatial answers to the task, as well as the exciting moments of the one-hour exhibition organized at the open space on Belgrade Quay in Novi Sad.

The first step was to explore the real spaces in Novi Sad in groups of 25 students, and the entire framework has been developed from the theme of the Venice Biennale topic called "Common Field". In the local framework of student work, the "common field" was defined in the context of the identity of the city consisting of the Danube, the riverbank, and the Danube Street. In relation to these elements, another 6 surrounding streets were defined, with views to the Danube River. All chosen streets were created at the beginning of the 18th century, and have different characteristics and morphology, following the development of Novi Sad until today. They represented totally different character compared to the Belgrade quay that was created in the middle of the 20th century.

The second step in the work process followed a detailed multi-layered survey of selected 6 streets. The task for students was to position their own identity of the group in which they worked (4-5 students) in real spatial frameworks that they defined and recognized as close to their own expression through the previous step. The means of expression was photography, so for each street there were 4 completely different ways, approaches, and representations of personal identification. The inclusion of the personal attitude in this step contributed to the deepening of the experience of space, and a better approach to the next step.

The third step was the central theme of the process and took place in the form of a workshop, where all students participated together, again divided into previously defined smaller groups. The task was related to the previously defined state on the space (the street they analysed) that they expressed

through a spatial installation measuring 50x50x50 cm, using all available materials. It was not necessary to show the real space, but their thinking, attitude, idea, and experience about the chosen space. The way of presentation also represented the students' reaction towards certain aspects of the real space, which was clearly visible through the photographs of installations made at the end of the workshop.



*Figure 2. The third phase in the project "About space" that took place at the Faculty of Technical Sciences in the form of a workshop with all students.*

The fourth step was to show in the form of flyers the entire process of analysis and thinking that the student went through from the exploration of real space to their thinking about space, again working within small groups, using text and photography as a means, trying to show their own thinking process as clearly as possible. The final step in the process was a joint public exhibition on the Belgrade quay, opposite the Petrovaradin Fortress as the landmark of the city, with the aim of opening a potential dialogue with passers-by. Through the exhibition, a synthesis of space was realized, which was the starting point of all phases of work, students and their attitudes about space and the whole process as a single system of thinking, including the public as observers. By two media, the entire process of work was recorded and shown (as a video work and as a spatial installation of photographs), and then presented as part of the event "Eye of Architecture".



*Figure 3. Joint public exhibition on the Belgrade quay, opposite the Petrovaradin Fortress.*

### 3.3. SUBURBIUM - THE SUBCONSCIOUS OF THE CITY, RESEARCH PROJECT AND THE EXHIBITION

The research project related to the Lower town (*Suburbium*) of Petrovaradin fortress was also one in a series of projects developed within the regular teaching in the subject "Introduction to Architectural Design" at the first year of architecture studies. The main characteristic of this project, as well as previous ones, is that it had two phases. The first one involved the development of the teaching process by applying various educational formats designed to deepen the research of current topics of contemporary architectural practice. The second one involved defining of a possible type of presentation appropriate to the presentation of the achieved outcomes of the students' work, and then the final design of the complete event.

The teaching process for the project was carried out during the semester. Starting from the theme of the Venice Biennale of Architecture "Fundamentals", it was placed it to the oldest part of Novi Sad – The Lower town of the Petrovaradin fortress as the local context and the spatial framework for the development of ideas. After a detailed analysis of the available information and documents about the selected area, the final topic for the project was formulated. The work process proceeded in several stages. The first step involved the deployment of 120 students within 24 teams. After that, the process of initial acquaintance and research of the suburban area began, as well as the discovery of possible interpretations of the defined topic through a physical, historical, and sociological context. The next step involved defining a common position on the set topic, and then choosing the technical and expressive means that best illustrates the creative concept of each team. Using photography, models, catalogue, video, spatial and sound installation, and performance as a means of expression, students presented their impressions on the oldest part of the city, its history, but also possible directions of development.

The second step involved exploring the potential of certain types of events suitable for presenting the outcomes of the teaching process to the professionals and public. In this context, an exhibition of photographs in the form of an ambient installation in the house of Ban Jelačić in the suburbs of the Petrovaradin fortress was designed. The concept of the event implied a directed walk of visitors through the exhibition space enabling direct acquaintance and experience of the two spatial levels shown in the photos. The first level of real space was recorded in photographs that carry the sensibility of the author and his spontaneous feeling and initial way of perceiving the ambience. The second one refers to students' photographs of final works that have shown more deeply their thoughts and attitudes about the space and phenomenon of the suburbs of the Petrovaradin fortress. By bringing into direct physical connection photographs of these two levels, the observer, as well as students during the research process had the opportunity to briefly experience, but also understand many peculiarities of life in the complex and multi-layered space of the Lower town area of the Petrovaradin fortress. The ambient installation, as well as the exhibited works illustrated the view that the multimedia of architecture is implied today, as well as that creative forms of teaching of a research character can contribute to the formation of the architect as a creative personality within a wider social context. In addition to this specificity, the ephemeral character of the exhibition lasting two hours suggests changeability, which is one of the basic characteristics of space, and therefore architecture as a discipline today.



Figure 4. The exhibition "Subconscious of the city".

#### 4. CONCLUSION

The interactive educational processes, creative workshops and research through the project were aimed at improving the traditional tuition by the introduction of new, contemporary contents, through a range of multimedia projects and visual research in the context of education in architecture. By this approach and the introduction of new teaching methods, the educational programme at the studies of architecture has been improved and updated, at the same time pointing to a wider field of action of architects and architecture. The results of all workshops were presented at public exhibitions, which were specially prepared by the teachers for the exhibition, specifically designing the whole way of presenting the process. The presentation of results of the students' research in a public space which is not only of a gallery type, allowed for the public to become familiar with the educational activities of the Department of Architecture and Urban Planning of the Faculty of Technical Sciences, University of Novi Sad, as a possibility of using a space which belongs to industrial heritage for the purposes of education, culture, and arts.

Within the framework of all abovementioned projects, it has been confirmed that architecture has a multidisciplinary character, and that the students of architecture can use "research by design" method for solving design problems through an experimental approach in their learning process during the first semester of the education. This approach can be altered each year with a new conceptual framework, with the aim of assisting students in acquisition of design competences, in both theoretical and practical terms. The results of this approach, regarding the improvement of the higher education, stimulate the ideas of the active student participation in the educational process, with an emphasis on learning through exploration, as in this way they create new experiences and gain new knowledge. Considering the entire creative process, we can conclude that the implementation of "research by design" in creative disciplines in the initial educational stage may provide students with a solid basis for the development of creative thinking and creative work. Besides, the outputs of students' research, formed in different and untypical formats, confirm that the extended field of action of architects is followed by the new means of expression and the architectural practices which are based on the development of personal potentials, revealed, and developed by the influence of research projects.

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