

## THINKING CONSTRUCTION AS DESIGN AND FUNCTION OF ARCHITECTURE

**Radivoje Dinulovi•**, PhD, Associate Professor, Faculty of Technical Sciences, Department of Architecture and Urbanism, Trg Dositeja Obradovi•a 6, Novi Sad, Serbia, [radivoje.dinulovic@gmail.com](mailto:radivoje.dinulovic@gmail.com)

**Dragana Konstantinovi•**, Assistant, Faculty of Technical Sciences, Department of Architecture and Urbanism, Trg Dositeja Obradovi•a 6, Novi Sad, Serbia, [konstan\\_d@yahoo.com](mailto:konstan_d@yahoo.com)

**Miljana Zekovi•**, Assistant, Faculty of Technical Sciences, Department of Architecture and Urbanism, Trg Dositeja Obradovi•a 6, Novi Sad, Serbia, [miljana\\_z@yahoo.com](mailto:miljana_z@yahoo.com)

### Abstract

**Introduction.** The main educational line developed at the Department of Architecture and Urbanism (Faculty of Technical Sciences, University of Novi Sad, Serbia) consists of several **Architectural Design sub lines/courses** starting at the 3<sup>rd</sup> year of Bachelor course. Applied teaching strategy is anticipated as a continuous knowledge upgrade. The strong emphasis is made on personal development of architectural design brief and understanding its importance for concept development, through comprehension of its wider social role, specific users' needs and overall ideas about different levels of meaning in architecture. The complexity of design process and its continuous evolution in nowadays practice stressed the need for reconsideration of the architectural design education input. The first results we get – design projects of the 3<sup>rd</sup> year students - showed the narrow scope of influences that reflect on design outcome. Our experience derived from valorising students' design projects showed that certain ideas and skills concerning the position of available technology on design process are not developed at all. Contemporary architectural production shows redefined position of technology within design process where integral approach is expected and expressive potential is outlined. That initiated idea of expanding the **Architectural Design** course on the first year of studies, by introducing the course **Architectural Construction 1**, that will combine preparation of students for architectural design

sub courses to come in the higher years, by teaching them the basics of construction and service technology, and expanding their comprehension of design process complexity. The course will be considered as first milestone in Architectural Design education.

**Materials.** The basis for course development is in depth analysis of design projects of 3<sup>rd</sup> year students. Although some of them show strong ability for concept development and its basic materialization, most of them do not consider technology as a parallel line in design idea development. The understanding of technology, both structural and service, is reduced to application of skills for specific construction problem solving and rare are the cases where contemporary technology motivates design itself.

**Methods.** Introduction of new course anticipates development of new teaching methodology with various models of training and learning. The lectures will broaden the scope of the 1<sup>st</sup> year student knowledge about design process, while mentored studio practice will strengthen their individual thinking capabilities and development of their own design process methodology, through experiments, case studies, workshops and design work.

**Results.** Expected result will be monitored on both course design works outcomes, as well as students' design process approach and results on the higher years of Architectural design course. The major progress is expected in enhancement of students' ability for creative thinking, derived from solid knowledge base and developed design capabilities. The adoption of integral design process will improve students' understanding of contemporary architectural practice.

**Keywords.** Architectural design; architectural construction; technology; teaching methodology; educational upgrade.

## **Introduction**

In the course of recent coordinated reforms of higher education to meet Bologna Convention, the Department of Architecture and Urbanism Curricula has undergone radical transformation. Beside the changes regarding organization of education and examination process, and shift to one subject-one semester model, this created desirable void for introduction of new courses and serious re-evaluation of existing ones.

Architectural and Urban Design Courses are regarded as a major in the Architectural and Urban Design Syllabus. These courses are thought through 3 years in the four years Bachelor Degree Curriculum, and introduced as a major of the Master by design coursework.

The complexity of design process and its redefined position in nowadays ambiguous environment, which transforms rapidly, highlighted the need for reconsideration of the architectural design education input. Design projects of the 3<sup>rd</sup> year students demonstrated the narrow scope of influences that reflect on design outcome. Very elusive ideas and fragmented knowledge about technology application in design process is evident in most of designs, no matter their design value. In contemporary architectural production, position of technology in design process is promoted, from the point of applying technology to the point of expressing technology. This consequently affects architectural design education methodology, which needs to be reconsidered, and to move from traditional conception of teaching facts about available technology to more open and inclusive one. Given the fact that “architectural education in general and construction education in particular has to promote the Design / Construction continuum” (Papalexopoulos, 2006) we anticipated the idea of teaching construction as the first milestone in architectural design education.

## **Facing the Challenges of Teaching Architectural Education in Serbian Context**

Main concept of the school curriculum is built environment comprehended as a whole, with strong connection and interdependence of architectural and urban design. Architectural Design Course has unique course organization, delivered through continuum of three years, respectively, where each level of the

course focuses on the particular issue of the rather broad scope of the subject. The organization of Architectural Design course thus is structured through lectures given by course Professor and guest lecturers, and practical classes- Design studio, which challenges practical application of the subject thought.

One of the main theses in teaching architectural design is importance of the personal development of architectural design brief. By defining/ considering brief as the essential part of design process, student's approach to the process itself appears to be more personal, research oriented and inclusive. The importance of the final user, even though he is imaginary one, close definition of his needs, attitudes and habits, renders the whole process. This does not exclude rest of the relevant issues: development of the brief anticipates strategies and to some point design intentions regarding form, function, construction and technology.

Teaching architectural design in Serbian context is rather challenging on numerous levels, even in its very basis, as is establishment of design studio. The establishment of creative environment is not an easy task in given space and resources of Serbian Universities. The lack of permanent studio setting requires reinvention of creative environment for each and every Studio class. Also, instructor-student ratio of one to twelve is at the moment just a goal our reform is targeting. In the time when our Universities are trying to get along Bologna Accord, we need to explore models for the time in-between.

### **Design vs. Technology; Theory vs. Practice**

Through formulating steps toward reforms that need to be applied we were challenged by simple process of defining problems. Once they were clearly stated and explained through examples (this refers mainly to students' works) it was necessary to establish some sort of hierarchy in dealing with them. As the main goal was to solve or to push from the bottom line all the existing problems, it was clear that that was not possible by simple all-and-now approach, but through strategy all-in-acceptable time.

One of the main problem occurred during the evaluation process of the first results from Architectural Design Studio – design projects of the 3<sup>rd</sup> year students: the scope of considered influences on design projects was quite reduced compared to all the forces that determine architectural design, referring primary to newly

developed technologies, constructions, structures and materials. The design itself, although often highly ranked, showed no connections with other potentials of architecture. This quite disturbing problem came at the surface by dividing to groups of those students who simply put design above all forces and showed no interest in solving problem for real, but stayed in the secure field of concept design and those students who simplified their design according to already familiar traditional technologies.

Figures 1, 2 and 3 show students' works with narrow scope of any kind of influences on design projects – the question is: what really happens to design when technologies “come in” because they were not considered at the first place? These examples illustrate a kind of approach that outlines development of form disregarding technology. Figures 4, 5 and 6 show final results of students' design projects where design did not reach its full potential, restricted with rather traditional technology students were familiar with.

Seriousness of the problem became even deeper while searching for the answer – if not at the 3<sup>rd</sup> year, when does actually technology take the initiative? Design projects results at the 4<sup>th</sup> and 5<sup>th</sup> year were just slightly different, as well as the results we got from the Master design projects.

Polemics continued with further questioning about all sorts of factors that influence students' design process. Two main lines of influences were outlined: the first one – quite problematic architectural production in our circles, and the other – problem of teaching constructions and technologies at the Faculty.



*Figure 1, 2. Master design projects, (on the left) Library Extension, author: Bojana Miškeljin, (on the right) Centre for Philosophy and Arts, author: Ivana Miškeljin*



Figure 3,4. (on the left) Master design project, *Mixed Use*, author: Marija Dori•, (on the right) 3<sup>rd</sup> year student design work, *City Gallery*, author: Mirjana Prpa

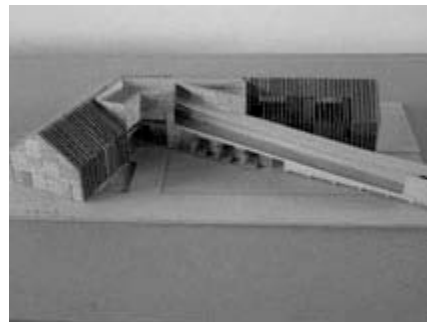


Figure 5, 6. 3<sup>rd</sup> year student design work, (on the left) *Hobby Centre for Origami*, author: Višnja Žugi•, (on the right) *Carpentry Hobby Centre*, author: Željko Bari•i•

Years of isolation, limited possibilities and resources caused a state of immobility of Serbian architectural production. In spite of hyper production of certain typologies in recent years, civil engineers and architects still rely on traditional technologies and building techniques. Sadly, contemporary architectural practice is theoretical subject matter learnt in the Architectural Design Studio at the Faculty, while practice in our circles remains almost completely and uninventively traditional.

While European architectural education faces problems of catching up with the unstoppable practice - according to statement that “*the gap between education and practice has been growing as practice is evolving new forms of inquiry counter to the traditions of architectural education*” (Malecha, 2006) - Serbian problem occurs completely opposite. Our architectural education promotes the new way of thinking and understanding architecture, while the

architectural practice and market represent barriers that we are still not able to overcome. The main thesis of theory and practice confrontation in both European and Serbian context exists as the problem of highest urgency to solve, but different surroundings, political backgrounds and social conditions brought up completely different relations and observing angles. Technologies evolve with society's prosperity and openness, but when specific society gets isolated for any reasons, all factors of prosper stop developing during that certain period of time. What attitude should education assume in that case?

### **Defining strategy for teaching architectural technology**

Considering that "waiting for the practice to evolve" in Serbian conditions could be disastrous for generations of architects to come, occupied by dealing with the Bologna platform conditions we concentrated on reconsideration and reformation of Architectural Design and Construction courses taught at the Faculty. As "*the mode of teaching architectural technology is not easily decided*" (Cavanagh,2004) focusing both on theoretical and practical knowledge, we initiated the idea of expanding the Architectural Design to lower years of Bachelor course by introducing course Architectural Constructions 1 at the first year of studying.

The 1<sup>st</sup> year students are already acquainted with courses dealing with architectural analysis and elements morphology. However, these courses are not integral part of the Architectural Design course line and for this reason hard to undergo major changes. Knowledge acquired through these courses, although essential for students' comprehension of function in architecture, showed as insufficient for further design projects development. At the other side of pre reformed program stood courses that were dealing with constructions – Structures, Materials and Constructions, Theory of Constructions, Structural Systems, Supporting Constructions. The main problem was that students' knowledge from this field remained strictly one-sided, for some reasons useless, because it simply did not show as the supportive influence on architectural design in their design projects. Taking all this into consideration, we formulated the idea of teaching constructions that need to be shift away from linear, sequential design process that is taught in these courses.

With new Architectural Constructions 1 course we hope to establish firm basis for understanding and applying new technologies in architectural design and to upgrade the way of thinking architecture through all parallel influence lines. At the other hand, Architectural Constructions 1 should represent a sort of connection between the design process led in the studios and all the other construction courses (taught by civil engineers) that reflect the state of the art of Serbian practice.

By introducing this course as the first step in the reforms that are ahead of us, hopefully we shall establish necessary link between concept design and final architectural design projects. Applied teaching methodology is found on wide spectrum of teaching and learning models – from examining contemporary architectural practice and technology, realizing the technology and construction potential in expressing architectural form, evolving the way of thinking and setting architectural concept, confirmation of these actions through experiments and thematic workshops, to concrete work in studios. This introduction into architectural design should provide us completely different students input with the broaden understanding of all influential forces on architectural design. The platform of continual educational upgrade should give more competitive Master design projects of much higher quality.

### **Course Basis and Development**

The slow changes in education methodology are much more restricted by inadequate means but with narrow interests of participants. Our scenario for course development involved larger groups of student, even 20 in the class, in four hours time-format that occurs one per week. This way, the design of the course program had to include development of each class scenario, which will thoroughly regulate the time frame for each of the activities planned.

Teaching construction as introduction for architectural design implied the teaching methodology of design studio. The course lecture format was basically oriented towards exploration of architectural concept and comprehensive understanding of specific design issues, in this case with emphasis on exploring the position of technology as the core and motivator for development of a design idea. The main purpose of the students' work in the studio is to equip students with facts and skills and do that through creative

environment. If the “facts are knowledge in different disciplines related to architecture in different ways (directly and contextually)...facts to get an overview, facts to make an association from”, and “skills are different means of expression”, then the subject is somewhere in between these two polarities (Bucholz, 2007). The major challenge of course syllabus development was to evolve teaching strategy for the subject that is both acquiring facts and developing skills. The body of facts needs to be comprehensible to the first year student but to stimulate personal interest and design research. Considering the fact that their skills are rather underdeveloped, the question arises: how to implement facts by training skills?

The main task of the students` studio exercises was to evolve architectural design for thematic pavilions, from concept to details, where the technology and applied construction system is embedded in design concept. This led to the point where we had to make a certain compromise and emphasize the importance of the process over the beauty of the artefact. This way, we encouraged personal development of design process in early stages of architectural education, in order to support the exploratory spirit. The process oriented approach will change the comprehension of structural issues, from the point where the structure is just applied “bearing solution”, postproduction phase that does not necessary include architect, to the point where it is integral part of design concept and solution.

### **Unsolved problems**

“Space is evolving through design and even through the production/construction phase” (Papalexopoulos, 2007) thus anticipating integral approach with redefined positions of the acting influences, strongly embedded in IT moment.

This affects architectural education and motivates our endeavours as close participants in education process. However, few questions are fundamental for further refinement of the strategy. If the realms of built environment are showing traditional construction process, how far should we push the education on construction technology? What are desirable criteria to be met, European or Serbian? Seen from the point of education quality, these changes are fruitful in terms of increasing our competitiveness among European Faculties. With described changes and reforms still to come, we shall produce

architectural engineers as competitive profile for the European market, but what happens with these “super-educated” engineers in the realms of our domestic market? Would they be able to respond to strict needs of investors and market that do not understand nor consider new technologies and constructions?

Balancing knowledge base between these two extremes, we try to equip students with facts about present state of play on the market but also train them for creative exploration to meet the future demands. For that reason, learning the process is a vital part of education that will “infuse structure of thought developed as a tool to respond to blinding change in building materials and the technologies.”(Malecha, 2007).

The following steps to be undertaken will take us to the next stage dilemma: if one Architectural Construction course is integrated into Architectural Design course line, is there an interest for development of Architectural Construction courses at all? Should we aspire to next level of integration or preserve the existing course matrix? Perhaps, the increased number of hours for Architectural Design course could give us desirable time-frame for synthesis of knowledge. Even if that is the case, we believe that establishing Architectural Design course line from the first year of studies, through learning to “think construction”, is fundamental.

What is expected of new course is development of close and lasting collaboration between research, practice and education that will strengthen students’ ability to comprehend and apply facts and skills taught in the class. This “integrated educational and research infrastructure” will also help overcoming widely recognized and criticized detachment of architectural education from practical realms (Riley, 2006). The future shifts in practice could be partly generated by the firm knowledge base of nowadays students and tomorrow’s practitioners. As for the moment, research potential is seen in development of personal design process tool, with clear comprehension of technological background. Resting on computer simulation we build our strategy for future practical application, in strong belief that time when conventional design/construction processes belonged to different phases is far behind, and integral design and taught is the key word.

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