

CHANGING ARCHITECTURAL EDUCATION FOR REACHING SUSTAINABLE FUTURE: A CONTRIBUTION TO THE DISCUSSION

Danijela Milovanović Rodić¹, University of Belgrade, Faculty of Architecture, Belgrade, Serbia
Jelena Živković, University of Belgrade, Faculty of Architecture, Belgrade, Serbia
Ksenija Lalović, University of Belgrade, Faculty of Architecture, Belgrade, Serbia

This paper discusses potential changes for the architectural education in response to rapid environmental, economic and socio-political situations, globally and locally. Unpredictability and complexity of those changes on one side and increasing exclusion of architects in urban developments on the other side, are forcing us to rethink the role and purpose of architects and architecture in society in general. We started to question methodology and the substance of architectural education which would create professional architects that would be able to deliver and implement creative sustainable solutions. It is evident that the need for the sustainable architectural design, sensitive to environment and energy issues, has reached a critical level in both public and professional circles. However, the issue of social sensibility is still not adequately taken into consideration by professionals. We argue that it is a consequence of archaic academic curricula which must be changed in order to support a paradigm shift. This change would be from the "architect provider" to the "architect enabler". As a result of this issue, we introduce a new educational methodology to support: (1) building student's capacity for being engaged in collaborative design process, and (2) building bridges between the different disciplines in order to reach integral education.

Key words: : architectural education, sustainable future, collaborative design process, integral design studio.

INTRODUCTION

New millennium came with new challenges for architecture as a profession: it has to transform and adapt itself in order to ensure a role with a greater relevance in a global search for sustainable solutions. How can teaching architecture prepare students and make them able to respond to these challenges? According to the UNESCO and International Union of Architects' (UIA) Charter for Architectural Education the "architecture involves everything that influences the way in which the built environment is planned, designed, made, used, furnished, landscaped and maintained" and that "architectural education constitutes some of the most significant environmental and professional challenges of the contemporary world" (UIA, 2011:1). If so, how should the curricula be re-designed to accommodate a better understanding of consequences of climate change, rapidly

urbanizing agglomerations, economic uncertainty, raising importance of technology, rural exodus, environmental degradation, inequalities and informal/illegal development? These issues cannot be addressed through a single profession so how can we best teach and prepare students to work in close cooperation with other professions? As said, on one side, we have to deal with the increasing complexity of the architect's role (knowledge, skills, competence, etc.) and on the other with increasing exclusion of architects from built environment projects. How can architecture achieve better outcomes and avoid undesirable consequences for local communities under 'globalized' conditions of uncertainty? Architectural education should encourage creativity, dialogue, inclusivity and critical thinking, but also a willingness and determination toward effective communication and collaboration. This article should be understood as a call for discussion and tries to contribute with ideas of some possible courses of changes in architectural education in order to reach that ideal.

NEW ISSUES OF IMPORTANCE

Changing perspective on architect's role and position

There are different perspectives on architect's role in the process of creating of space. Types and origin of ideas, values, knowledge, facts and attitudes embeded in spatial solutions depend on that perspective - understanding personal position and role in that process. Defining personal position and role in the process of creating/transforming of space/world is influenced by personal understanding of the world. In our opinion, today there are two parallelly existing philosophical positions serving as sources/starting points of contemporary architecture practices: (1) postmodernism:

This paper is prepared as part of the project: Spatial, Environment, Energy and Social Aspects of Developing Settlements and Climate Change - Mutual Aspects, which is financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia, No. TR 36035.

¹Bulevar kraljica Aleksandra 73/II, 11 000 Beograd, Serbia
danstev@afrodita.rcub.bg.ac.rs

there are numerous perspectives of the world and there are no criteria for choosing one, true and real; and (2) reflexive modernism: a picture of the world is formed through interactions of different perspectives.

Because of the fear of error and unforeseeable consequences of acting, striving to achieve "one perspective and to conquer certain knowledge that is true and unchangeable" is natural (Stojnov, 2003:11). According to postmodern understanding of reality, this will never happen. Postmodern perspective contributed to relativisation of the existence of one set of measures of what is correct and offered "to people to learn that they can and that they should get decentred from their perspectives and understand that they are only one of many ways of designing the world (or a number of worlds) and that other perspectives are not necessarily heresies, misconceptions, sophistries or betrayals but huge treasure and products of human spirit's creativity" (Stojnov, 2003:12). A knowledge consists of individual, plural and heterogeneous knowledges. According to Jean-Francois Lyotard (in Đurić, 2011) there are no "comprehensive views" that can be used to evaluate universal truth about anything.

Reflexive or interpretative modernism assumes that a picture of the world is created through interaction of several subjects, where each individual picture gets changed, confirmed or rejected in interaction with other subjective pictures. Interpretative approach assumes that "an individual is not isolated from others and that he lives in a complex network of social relations with others. It is through this network that culturological resources, such as ways of thinking, organization and ways of living, are developed, transformed, maintained and reproduced" (Geertz, 1983 and Latour, 1987 in Healey, 1997:44). Since architecture is a profession that influences and changes in various ways people, processes and spaces, we believe that it has to have rational reasons for the professional choices. Reflexive modernism stresses that the rational is confirmed in interaction with a given social context. Thus, the process of creating solutions has to be inclusive, i.e. capable of accepting the differences, and also to enable inclusion of non-scientific variables. This assumes joining of technical and scientific knowledge with moral principles and moral responses, which together create what we call a practical awareness and common sense.

Energy and environmentally but socially sensible design also

"Al Gore talked about the climate crisis You see, he's right. I mean, there is a major climate

crisis.... But I believe there's a second climate crisis, which is as severe, which has the same origins, and that we have to deal with the same urgency. But this is a crisis of, not natural resources – though I believe that's true – but a crisis of human resources." (Robinson, 2010). The topics of global warming, climate changes, energy efficiency and methods of protection and improvement of living and working environment are very present in professional and wider public. These topics are embedded in development documents of various levels of competence (Živković and Lalović, 2011), necessary laws have been passed, sub-laws and recommendations are being developed, and standards introduced on all levels of architectural activities: from production of construction materials or software solutions (Lalović and Živković, 2011) to planning of spatial development. Education of architects in regard to these topics has obtained its initial inputs and the process of transformation has started. It is essential that a critical mass of those alarmed has been reached so that in the years to come we can expect a considerable professional progress in creation and implementation of environmentally sensible and energy efficient designs (Bajić Brković and Milaković, 2011). According to Al Gore (2010) we have at our fingertips all the tools necessary to overcome the climate crisis and that the only ingredient missing is collective will. Although there is a considerable space to improve the curriculum with the knowledge from these fields, the focus of this article is hereby transferred to the field that, as we believe, has been neglected in the process of education of architects: socially sensible design and socially active architects.

Current global economic crisis has made the gap between the poor and the rich even bigger, has increased the number of urban suburbs' poor, unemployed and socially excluded inhabitants (Jokić and Petovar, 2009), has emptied some more villages, contributed to the degradation of the surrounding and has made social inequalities even more spatially visible. The gap between what millions of people need and what the current system of housing and building provides continues to grow (Fisher, 2008). This represents an urgent invitation to mobilize all those involved in development, including the architects. In the activities of architects, i.e. their education, some new approaches can be recognized as well as some new forms of macro and micro methods of interventions that can mitigate above mentioned social problems and trends. "Who are our clients, who do we work for? Is this a right time to move architects from the

position of service providers towards more active roles in creation of better surroundings and better society? Can architecture have any impact on the society at all? If yes, what are the creative approaches to the community?"¹⁾

A growing movement among architects and their architectural practice(s) can be recognised. It has many different names, such as "architecture for humanity", "public (interest) architecture", "emergency architecture", "architecture as activism", "architecture for the other 90%" etc., but similar ideology - architects can help the poor, marginalized, powerless, vulnerable people (Smith, 2007). The common meaning is the search for architectural solutions that address the most basic needs of the population not traditionally served by architects. A large number of international funds²⁾ and associations³⁾ monitor and support⁴⁾ the work of these architects, and a growing number of publications⁵⁾ and university programs⁶⁾ deal with this issue. The ideology of this architectural movement is a part of a broader ideological framework of socially and environmentally responsible architecture that is based on the following premises (Bell, Wakeford, 2008): some social and environmental problems can be solved by architecture; the main purpose of the architecture is improving the quality of life in community(ies); therefore, the subject of architecture are not only objects and spatial complexes, but the quality of life of individuals and communities in which they are placed; the meaning, purpose and quality of architecture cannot be considered without assessing the impact on the community.

The idea of socially active and responsible architecture is not new. The early modern movement possessed a clear sense of political engagement, and it envisioned broad societal change as a crucial and fundamental part of architectural practices. In 1950s, 1960s and 1970s several waves of socially and environmentally sensitive movements among architects occurred as part of broader awakening processes: social activism and civil rights movement in 1960s, environmental movements in the 1970s (concerns about pollution, waste disposal, energy resources, etc.) and 1980s anti-nuclear movement. They initiated a wide search for harmony between the inhabitants and their physical and socio-cultural environment and resulted in numerous human settlement concepts/proposals/solutions, different in size, needed technology, design methodology, etc. The main specific of new generation of socially active architects is focusing "on providing the benefits of architecture to

specific categories of people, those traditionally un-served by the profession": vulnerable, poor and marginalized people (Bell, 2003). In this case focus is on the architectural solutions to humanitarian crises. According to Bell and Wakeford (2008) this movement is moving from the margins into the mainstream: it is the architecture for the new era with new approaches to prefabrication, manufactured housing, and modular design, merging the roles of designer and developer with an enabler deeply committed to pro bono work.

"The approach to architecture which assumes architects waiting for a strong investor willing to invest in (often unnecessary luxurious) projects is a model that makes us wonder whether the profession is aware of the moment we are at right now. While on one side we are standing in line waiting to be chosen by a rich investor to bring into life some of their (or our own) dream designs, on the other side we are surrounded with the misery of millions living under extremely inadequate conditions, without proper apartments, schools, public and common areas" (Rajić, 2011). Is this a issue that concerns the practical work and education of architects or not? According to UIA (2011) it is: "There is still room for the development of new tasks for the profession when architects become aware of the increasing needs identified and possibilities offered in areas which have not, up to now, been of major concern to the profession...This is particularly true for those who are working in a developing context, where the architects could accept the role of an "enabler", rather than that of a "provider", and where the profession can meet new challenges....There is no doubt that an architect's capacity to solve problems, can greatly contribute to tasks such as community development, self-help programs, educational facilities, etc., and thus make a significant contribution to the improvement of the quality of life of those who are not accepted as citizens in their full right and who cannot be counted among the architect's usual clients." (UIA, 2011).

RETHINKING AND REDISIGNING THE DESIGN PROCESS / STUDIO

Design studio or studio based pedagogy is considered to be main methodological tool of architectural education. Studio is a pedagogical construct by which newly acquired knowledge and skills are brought together and applied in the problem resolving design process. It is a process which presumes applying of theoretical knowledge and concepts in to certain context and finding practical problem solutions. However, rapid changes in socially generated knowledge and/or changes in skills and

methods and instruments for their mastering should have a direct impact on the way we conduct studio activities. Accordingly the foregoing, it is necessary to reconsider common studio design learning process, which in order to be practically effective should take form of collaborative and integrated learning and working.

Collaborative process: group learning and designing

The journals *Design Intelligence* and *Almanac of Architecture and Design*⁹⁾ in the last 13 years have been researching the quality of schools for architects in the USA and adequacy of education of young professionals for practical needs. For the research done in 2001, 800 leading architectural companies in the USA were interviewed. The question referred to what kind of knowledge and values they wanted from young architects. Most of them answered that "We want students who think in a creative way... We don't care much about their skills...we can help them develop their skills in the office" (Al-Qawasmi and Vasquez de Velasco, 2006: viii). Further on during the interview they were asked to identify the schools that in the previous five years had released the best educated people in their opinion⁹⁾. After getting an insight into the curricula of nominated best schools, the conclusion was that the only common denominator was "knowledge based design" curricula, i.e. the curricula based on the attitude that "field of architecture holds a knowledge base of its own", therefore, "the solutions were generated exclusively from that base" (Al-Qawasmi and Vasquez de Velasco, 2006: ix). These results showed that in spite of their claim that they need employees "who think in a creative way", these companies actually look for "those who can deliver sound product in time", i.e. those who are efficient and effective rather in preparation of technical documentation than in making sustainable design solutions. In a similar research, today, 10 years later, leading schools of architecture tells us that their key commitments are: collaborative working methods, interdisciplinary approach, mastering communication and sharing skills: "These programs are graduating students who are able to tackle complex and difficult work, create and share knowledge, and invent new design solutions in their fields. The best students have the human skills and personal temperaments to collaborate at professional levels ... Students learn not just technologies and craft but also leadership, judgment, and insight into changing contexts and upcoming challenges" (Cramer, 2011).

This shift from "knowledge based design" to

"interdisciplinary and collaborative design" implies that it is recognised that complex global problems require new ways of learning, thinking and working. Sustainable solutions cannot be generated only within one (architectural) profession but through active inter-professional cooperation⁹⁾. Additionally, every successful collaborative process creates a new resource for cooperation in other fields/problems/context of a given territory: "Participants develop new skills, build new networks, expand their activities and ambitions, learn that standards and structures can be adapted and changed with their mutual efforts" (Innes, 2004: x). In such processes the participants learn through single or multiple shifts in thinking – reevaluation and reformulation of initial interests they had when they started the dialogue (Innes and Booher, 2010:6). This is how creative solutions are reached, while the participants develop common meanings and new heuristics necessary for facing the problems and become more capable for realization of sustainable community development without instructions and directions of some authority in hierarchy: they become able to realize new ideas in practice, i.e. to introduce innovation. So, a collaborative process is not a process of bargaining and exchange that should lead to a compromise, but a process of searching for new solutions that represent mutually useful options.

Building architects' collaboration skills

Commonly, schools of architecture curricula focus on the development of the students' awareness, knowledge and abilities. These terms come from Bloom's¹⁰⁾ (Bloom, 1956:7) definition of educational objectives, according to which any given learning task favors one of three psychological domains: (1) Cognitive domain, revolves around knowledge, comprehension and critical thinking about a particular topic and deals with a person's ability to process and utilize information in a meaningful way¹¹⁾, (2) Psychomotor domain, involves manipulative or physical skills and (3) Affective domain, describes the way people react emotionally and their ability to feel another being pain or joy, it relates to the development of values, appreciation, empathy, opinions and attitudes that result from the learning process. The five major categories are listed from the simplest behavior to the most complex (Krathwohl, et al., 1973):

1. Receiving Phenomena: Awareness, willingness to hear, selected attention. Listen to others with respect.

2. Responding to Phenomena: Active participation on the part of the learners. Attends

and reacts to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).

3. Valuing: The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Student demonstrates belief in the democratic process, sensitive towards individual and cultural differences, shows the ability to solve problems, proposes a plan to social improvement and follows through with commitment, informs other on matters that one feels strongly about.

4. Organization: Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating an unique value system. The emphasis is on comparing, relating, and synthesizing values. Student recognizes the need for balance between freedom and responsible behavior, accepts responsibility for one's behavior, explains the role of systematic planning in solving problems, accepts professional ethical standards, creates a life plan in harmony with abilities, interests, and beliefs.

5. Internalizing values: The behavior is pervasive, consistent, and most importantly, characteristic of the learner and it is driven by his value system. Instructional objectives are concerned with the general patterns of student's adjustment (personal, social, emotional). Student shows self-reliance when working independently, cooperates in group activities (displays teamwork), uses a collaborative approach in problem solving, displays a professional commitment to ethical practice on a daily basis, revises judgments and changes behavior in light of new evidence.

In every educational process some affective domain objectives are realized, but these objectives, since not being specified in the curricula, can be found in so called "hidden" curricula (Roberts *et al.*, 2006) that remain undocumented and thus unvalued in regard to those from the cognitive domain. According to the UIA the objective of the architectural education is to "develop the capacity in students to be able to conceptualize, design, understand and realize the act of building within a context of the practice of architecture which balances the tensions between emotion, reason and intuition, and which gives physical form to the needs of the society and the individual" (Charter, 2005).

Integral design/studio: Crossing over and out of the discipline and sectoral borders

"A number of symptoms conceal the general cause of the disorientation of education in today's world: the loss of meaning and the universal hunger for meaning. A viable education can only be an integral education of the human being" (Nicolescu, 1999:1). Such integral education assumes the one that establishes "bridges between different disciplines", i.e. where solutions are looked for and created through cooperation and team work of students and teachers of different disciplines. "The architecture is a discipline which draws knowledge from the humanities, the social and the physical sciences, technology, environmental sciences, the creative arts and the liberal arts" (UIA Charter, 2011), and in creation of architectural solutions it is necessary to achieve integration of all knowledge sources. According to Nicolescu (1999) the cooperative design studios help students distinguish the following:

1. Multidisciplinary work - assumes researching certain topics through several disciplines at the same time. Disciplines are being crossed, but such work improves each discipline individually, and objectives/results remain limited by the frame of each individual discipline.

2. Interdisciplinary work - assumes the transfer of methods from one discipline into the other. Different levels of interdisciplinary work can be distinguished – from the level of application, i.e. direct transfer of certain method from one discipline into the other to a so-called disciplinary big-bang, when due to the knowledge gained through such transfer of methods between disciplines certain new disciplines are formed.

3. Trans-disciplinary work - assumes that an object of research exists between, over and

beyond all disciplines. The objective of trans-disciplinary work is to understand the world but with the assumption of the unity of knowledge: "... it is based on questioning, as well as on the rejection of all a priori answers and certitude contradictory to the facts. At the same time, it revalues the role of deeply rooted intuition, of imagination, of sensitivity, and of the body in the transmission of knowledge" (Nicolau, 1999:2).

Through integration of different disciplines in creating solutions we can reconcile effectiveness and affectivity, because sharing of knowledge is accompanied with a new tolerance grounded in trans-disciplinary work. It enables a comprehensive evaluation of the effects on surrounding, perception of life cycles of all components of the solution and provides a good basis for implementation of sustainable solutions. Three main work models can be distinguished, according the type and level of cooperative work in integral studio design, each one offering special learning opportunities for students of architecture:

1. Consultation model. Architecture students invite students from other disciplines to come to the studio, from time to time, as external consulting experts. This model is closest to the standard architecture practice. Result: Improved single disciplinary design.

2. Working at the same place model. Architecture and other disciplines students working side by side on the same project, each producing their own proposal. Result: Improved single disciplinary design.

3. "Real team" collaboration model. Students work in multidisciplinary teams, each encompassing architecture and other disciplines students to collaborate on joint individual projects, gaining as a result integral design.

Inclusion of the students from various disciplines into the process of creating

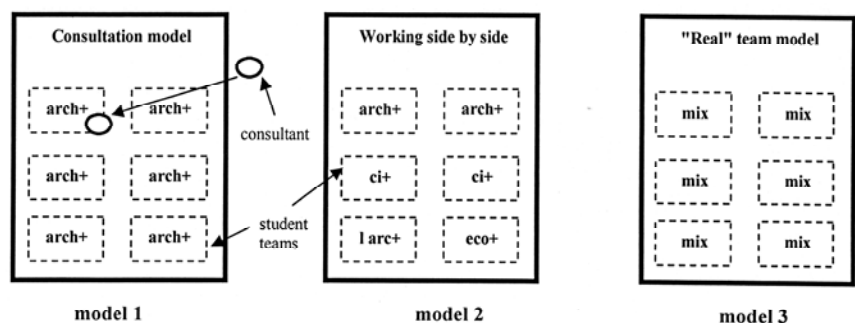


Figure 1. Options of working model in an integral studio – student teams differ in composition, i.e. type and level of cooperation. Key: arch + : students of architecture improved their design through the process of consultation (model 1) or working side by side (model 2) with students of other profession, ci: students of civil engineering, l arch: students of landscape architecture, eco: students of ecology, etc.; mix: multidisciplinary teams of students (model 3). Design: Danijela Milovanović Rodić adapting Lehman's model, (Lehman, 2006:93-95)

solutions requires a special pedagogical model that results in a particular type of learning situation. Collaborative model is successful in cherishing an interdisciplinary attitude, while simultaneously enabling creative design solutions and broaden social awareness (Lehman, 2006).

CONCLUSION

Key changes in contemporary architectural education should be generated from the shift in understanding of the role and the position of architects in the social processes. It is necessary to re-actualize social responsibility of architects and importance of their engagement in social life. Starting point should be redefinition of the quality of life values: relations among people, material, emotional and physical welfare, social inclusions, civil rights, possibilities of personal developments etc. An architect has to have a feeling of belonging to the community he works for. He has to understand the reciprocal link between himself, his actions and the context in which he works. In architectural education, both teachers and students should be socially aware and engaged people who perform a professional commitment to ethical practice on a daily basis. In that sense, development of affective psychological domain has great importance and should be included in the curricula.

An architect as a professional has to establish and interpret multiple relations within his/her working environment. These relations should not be only interpreted by scientific-technical language but also through socially recognised moral principles, values and ideas. The quality of architectural solutions should not be measured only in regard to achieved profit, fame or power, but first of all in regard to the improvements of the quality of life; not only of those the work has been done for, but all that are included or affected in the process of creating solutions, including the architect himself as well. This understanding of education and discipline indicates that viable solutions can be created only through an interdisciplinary and trans-disciplinary work and learning from each other.

Education of architects has to become a platform for enabling future effective and efficient collaboration between disciplines in dealing with the space. In order to achieve this, the broadening of the knowledge basis in curriculum is necessary, as well as the development of effective communication and collaboration skills. We believe that collaborative model of Integral design studio

can be successful in fostering an interdisciplinary and trans-disciplinary capacities of students and in raising their social awareness, without limiting creativity and imagination.

References

- Al-Gawasmi, J., Vasquez de Velasco, G. (ed.) (2006) *Changing trends in architectural design education*. Morocco: Center for the Study of Architecture in the Arab Region.
- Bajić Brković, M., Milaković, M. (2011) Planning and designing urban places in response to climate and local culture: a case study of Mussafah district in Abu Dhabi, *SPATIUM International review*, No 25, pp. 14-22.
- Bell, B. (2003) *Good Deeds, Good Design: Community Service Through Architecture*. New York: Princeton Architectural Press
- Bell, B., Wakeford, K. (eds) (2008) *Expanding Architecture Design As Activism*. New York: Metropolis Books.
- Bloom, B. et al. (1956) *Taxonomy of Educational Objectives: The Classification of Educational Goals; Handbook I: Cognitive Domain*. New York: Longmans, Green.
- Bloom, B. (1984) The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring, *Journal Educational Researcher*, No 13:6, pp 4-16.
- Bloom, B. (ed.) (1985) *Developing Talent in Young People*. New York, Toronto: Ballantine Books.
- Cramer, J. (2011) *Fostering Better Schools, Challenging Conventions*, published 20th November 2011. *DesignIntelligence*, <http://www.di.net/articles/archive/3746/>, accessed 30th November 2011.
- Đurić, D. (2011) *Teorije mode i moć*, skripta, radna verzija. <http://www.scribd.com/doc/8249441/Djuricmoda-i-Moc>, accessed 20th November 2011.
- Fisher, T. (2008) Public-Interest Architecture: A needed and Inevitable change (foreword). In Bell, B., Wakeford, K. (eds) *Expanding Architecture Design As Activism*. New York: Metropolis Books.
- Gore, A. (2010) *Naš izbor: Putevi rešavanja klimatske krize*. (first published 2009), Beograd: Geopoetika.
- Healey, P. (1997) *Collaborative Planning: Shaping Places in Fragmented Societies*. Vancouver, Canada: University of British Columbia.
- Innes, J. (2004) Taking the Three E's Seriously: The Bay Area Alliance for Sustainable Communities. Berkeley. Berkeley: University of California: Institute of Urban and regional Development. eScholarship - University of California, <http://escholarship.org/uc/item/7zm0f4x>, accessed 30th November 2011.
- Innes, J., Booher, D. (2010) *Planning with Complexity: An Introduction to Collaborative Rationality*. New York: Routledge.
- Jokić, V., Petovar, K. (2009) Socijalna isključenost i obrazovanje, *Arhitektura i Urbanizam*, No. 27, pp. 46-57.
- Krathwohl, D. R., et al. (1973) *Taxonomy of Educational Objectives, the Classification of Educational Goals. Handbook II: Affective Domain*. New York: David McKay Co., Inc.
- Lalović K., Živković J. (2011) Redefining The Approach To Structuring Information Support Climate-Conscious Behaviour In Urban Areas, / *International Conference: Ecology of Urban Areas*, Faculty of Technical Sciences "Mihailo Pupin", Zrenjanin, Politehnica University, Timisoara, 30th September 2011, Ečka.
- Lehmann, S. (2006) Rethinking the Design Studio: Art+Architecture - a Case Study of Collaboration in an Interdisciplinary Context, in Al-Gawasmi, J. and Vasquez De Velasco, G. (ed.) *Changing Trends in Architectural Design Education*, 91-106. Morocco: Center for the Study of Architecture in the Arab Region.
- Milovanović Rodić, D, Lalović, K., Nenadović, A, (2011) Virtual social Networks as a Booster for Reaching Livable Villages: Examining Serbian Cases. 47th ISOCARP Congress, Wuhan, China, October 2011.
- Nicolescu, B. (1999) *The transdisciplinary evolution of learning*. Paris: The International Center for Transdisciplinary Research, Pages: 1-11, The Learning Development Institute, http://www.learndev.org/dl/nicolescu_f.pdf accessed 30th November 2011.
- Rajić, T. (2010) Budimo ono što želimo da vidimo oko sebe. *Expedio*, <http://www.expedio.org/benefit-iving/index.php>, published 16 august 2010, accessed 30th November 2011.
- Roberts, A., Pearce, M., Lieberman, O., Matzica, W. (2006) The Development of Values in the Studio: A Hidden Curriculum? in Al-Gawasmi, J.; Vasquez de Velasco, G. (ed): *Changing trends in architectural design education*. Morocco: Center for the Study of Architecture in the Arab Region.
- Robinson, K. (2008) *Changing education paradigms*. Transcript of the lecture, 16 June 2008, London: RSA Animate. http://www.thersa.org/_data/assets/pdf_file/0004/558940/RSA-Lecture-Ken-Robinson-transcript.pdf, accessed 30th November 2011.
- Robinson, K. (2010) *Bring on the learning revolution*. Transcript of the lecture. February 2010. TED Talks, http://www.ted.com/talks/sir_ken_robinson_bring_on_the_revolution.html, accessed 30th November 2011.
- Stojnov, D. (2003) Relativizam: Bauk koji kruži naukom, *Zbornik Instituta za pedagoška istraživanja*, No 35, pp. 11-44.

UIA (2011). Charter for Architectural Education. The International Union of Architects. http://www.uia-architectes.org/image/PDF/CHARTES/CHART_ANG.pdf, accessed 30th November 2011.

Živković, J., Lalović, K. (2011) Ecological Riverfront Design And Climate Change, / *International Conference: Ecology of Urban Areas*, Faculty of Technical Sciences "Mihailo Pupin", Zrenjanin, Politehnica University, Timisoara., 30th September 2011, Ečka.

¹⁾ These are some of the questions opened during the conference titled: „Lets not talk about architecture“ held in Singapore in the beginning of August 2010. For more see: <http://www.expediitio.org/benefit-living/index.php>

²⁾ The Berkeley Prize focused on the social art of architecture; The Core77 Design Awards program - categories: "service", "social impact" and pro bono (for good) projects; The Curry Stone Design Prize - designers for social change; The Lewis Mumford Awards-Architects/Designers/Planners for Social Responsibility; The Rudy Bruner Awards - urban projects, distinguished by their design and social contribution; The Social Economic Environmental Design (SEED) Awards - excellence in public interest design.

³⁾ AIA, Architectural League of New York, American Society of Interior Designers, The Royal Institute of British Architects, The South African Institute of Architects, etc.

⁴⁾ 2001 Samuel Mockbee posthumously honoured - AIA Gold Medal; 2006 Cameron Sinclair won TED Prize for humanitarian design work; 2010 "Public Interest Practices in Architecture" awarded the \$100,000 Latrobe Fellowship from the AIA College of Fellows, etc.

⁵⁾ Some of most important authors / books are: Boyer, E., Mitgang, L. (1996) *Building Community: A New Future for Architecture Education & Practice*; Oppenheimer Dean, A. (2002) *The Rural Studio: Samuel Mockbee and an Architecture of Decency*; Bell, B. (2003) *Good Deeds, Good Design: Community Service Through Architecture*; Bell, B., Wakeford, K. (eds) (2008) *Expanding Architecture: Design as Activism*; Polak, P. (2008) *Out of Poverty: What Works When Traditional Approaches Fail*, Pilloton, E (ed)(2009) *Design Revolution: 100 Products that Empower People*; Cary, J. (ed)(2010) *The Power of Pro Bono: 40 Stories about Design for the Public Good*; Aquilino, M. (ed)(2010) *Beyond Shelter: Architecture & Human Dignity*; Sinclair, C., Stohr, K. (eds) (2006) *Design Like You Give a Damn: Architectural Responses to Humanitarian Crises*; Sinclair, C., Stohr, K. (eds) (2012) *Design Like You Give a Damn 2: Building Change from the Ground Up*; etc. *Architectural Record* dedicates its entire March 2012 issue to "Building for Social Change".

⁶⁾ Auburn University - Rural Studio, Cambridge University - Shelter Centre, Detroit Mercy -The Detroit Collaborative Design Center, Miami University - Over the Rhine Center for Community Engagement, University of Kansas - Studio 804, MIT - D-Lab; Stanford - Entrepreneurial Design for Extreme Affordability, etc.

⁷⁾ America's Best Architecture & Design Schools is conducted annually. The research ranks undergraduate and graduate programs from the perspective of leading

practitioners. This 13th annual survey was conducted in mid-2011. For more see: <http://www.di.net/store/best-architecture-design-schools>

⁸⁾ Research was conducted within the three years - 1998-2001. Firms have noted a number of skill deficiencies in their new graduate hires (respondents were asked to name up to three): 90% Building/structural knowledge, 78% Oral and written communication skills, 28% Practical business and practice knowledge, 19% Work ethic, self motivation, 16% Computer skills, including CAD, 14% Sketching skills, 7% Detailing knowledge, 6% Design theory, knowledge and history, 5% Teamwork skills & discipline, 5% Analytical thinking/problem solving, 3% Project management, 2% Knowledge of interiors, 2% Research skills, 2% Design skills, 2% Relationship between design and technology.

⁹⁾ Importance of integrated / interdisciplinary / de-specialized design process is undelined in architectural concept preceding sustainability paradigm. In mid-20th century ekistics occurred as a concept of the human settlements design process (embedded in Doxiadis's theoretical and practical work) that postulates scientific approach and its interdisciplinary nature: the process has to involve different professions and disciplines (geography, ecology psychology, anthropology, cultural, political, and aesthetics studies) in order to avoid chaos and to achieve balance between humans (individual and common values and needs) and the environment. In 70s of the 20th century also Buckminster Fuller's advocates de-specialization: "The key problem of humanity is understanding the disappearance of a comprehensive, because specialization leads to isolation, confusion and letting someone else be responsible and to think about the general and the common good."

¹⁰⁾ Bloom's main contributions are the classification of educational objectives and the theory of mastery-learning.

¹¹⁾ "There are six levels: 1. *Knowledge* - remembering. Exhibit memory of previously-learned materials by recalling facts, terms, basic concepts and answers. 2. *Comprehension* - understanding. Demonstrative understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas. 3. *Application* - applying. Using new knowledge. Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way. 4. *Analysis* - analyzing. Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. 5. *Evaluation* - evaluating. Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria. 6. *Synthesis* - creating. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions". Bloom (1956:201-207).