

Key elements of teaching sustainable design and their integration in Russian architectural education.

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Abstract:

It is widely understood now, that we have to change the way we live on Earth in order to survive as a species. Architects as designers of the built environment can have significant effect in this process by creating an environment that provides for human needs while still preserving and even improving nature. This understanding has led to introduction of courses in sustainable architecture in many United States and European universities, but at present time there are no such courses offered in Russian universities.

The study presented in this paper is conducted as a part of a graduate research thesis on developing a curriculum that would allow issues of ecological design in general and sustainable/regenerative architecture in particular to be an integral part of architecture education in Russia. The paper defines key elements in teaching sustainable design and ways to integrate those elements into curriculum of a Russian university. It examines courses in the field of sustainable/regenerative architecture taught at United States universities, as well as textbooks and other resources used in these courses. The analysis shows that successful programs don't focus on architectural applications alone, but develop general ecological attitude; provide students with the information on the available resources, tools and methodologies and their appropriate applications; and promote multi-disciplinary and holistic approach to design process. The study also reveals that issues of sustainability could be efficiently integrated into different course formats that range from lectures (ECS) to seminars with opportunities for hands-on experience (Vital Signs) to integrated design studio projects.

The second part of the paper provides an overview of the Russian system of architecture education, current level of environmental issues involved in the architectural educational process and existing opportunities for interdisciplinary study. It suggests several ways to integrate issues of sustainability into the curriculum, such as a series of lectures within the History of Modern Architecture course, an elective course in sustainable architecture, or a design studio project. It also stipulates the ways the key elements defined in the first part could be integrated into such courses. The paper concludes that sustainable/regenerative design can be an integral part of architecture education in Russia creating a new generation of eco-logical, as opposed to techno-logical, architects.

Key elements of teaching sustainable design and their integration in Russian architectural education.

It is widely understood now, that we have to change the way we live on Earth in order to survive as a species. It seems that the only way we can do that is through sustainable development. The Brundtland Commission defines sustainable development as that which “meets the needs of the present without compromising the ability of future generations to meet their own needs” (qtd. in Orr, 1992). I agree with David Orr in his opinion that the commission “hedged its bets between two versions of sustainability” – “technological” and “ecological,” that are both “necessary parts of sustainable world.” First, we have to stabilize “planetary vital signs” with the use of advanced technology, and then find the alternatives to our usual practices to prevent future problems (Orr, 1992). Architects as designers of the built environment can have a significant effect in this process by creating an environment that provides for human needs while still preserving and even improving nature. It is also well accepted that “higher education has the power to lead in this endeavor by exercising its role in training future leaders, teachers and other professionals and in producing the wisdom needed to face the challenges of an increasingly complex world” (Second Nature Home). This understanding has led to introduction of courses in sustainable architecture in many United States and European universities. In Russia the understanding of the importance of sustainable development is constantly growing. There are certain steps being made toward improving energy and resource effectiveness of the mechanical systems, but there is not yet much change in the area of architectural design. Specifically, there are no courses in sustainable architecture offered in Russian universities.

The study presented in this paper is being conducted as a part of a graduate research thesis. The goal of the thesis is to develop a curriculum that would allow issues of ecological design in general and sustainable/regenerative architecture in particular to be an integral part of architecture education in Russia. Throughout the study I have identified several key elements in teaching sustainable design and ways to integrate those elements into curriculum of a Russian university.

First, I have examined integration of issues of sustainability into architecture curriculums of the U.S. universities. I reviewed particular courses specifically concerned with sustainability, as well as textbooks and other resources used in these courses. The courses included environmental control systems lecture classes, as well as seminars on sustainable architecture, passive heating and cooling and daylighting. The preliminary studies show that successful programs don't focus on architectural applications alone, but develop general ecological attitude. It is important to not just provide students with the information on the available resources, tools and methodologies and their appropriate applications, but also to establish understanding of the philosophy and concepts behind the tools. Sustainable architecture is not just collection of “add-ons” – it is a whole different, integrated approach to architectural design. An important role in this design process is played by a multi-disciplinary and holistic design process: the architect is not just a “decorator” of buildings, he has to work with a diverse group of consultants and contractors and himself has to be proficient in many different areas, knowing the consequences of his actions. One way the integration of sustainability issues in architecture curriculum is achieved is through its

omnipresence. It is never taught as a single course, students are introduced to the issues of sustainability early in their studies and continue acquiring the knowledge throughout their course of education. The study also reveals that issues of sustainability could be efficiently integrated into different course formats that range from lectures (ECS) to seminars with opportunities for hands-on experience (Vital Signs) to integrated design studio projects. The hands-on, open-end projects are other important elements of teaching sustainable design. The way these courses are taught is as important as what is taught. All of the above-described elements were incorporated into several curriculum models for teaching sustainability in universities in general and in architecture programs in particular that have been developed over the past years in the U.S. (Second Nature, EASE Project, Vital Signs). They define the ultimate curriculum that would integrate issues of sustainability into higher education and that are model for all the universities.

The Russian system of architecture education is quite different from the American both in the administrative structure and in the level of environmental issues involved in the architectural educational process. The major difference between the American education system and the Russian is that in Russia students don't choose the classes that they take, but just follow a curriculum that is set by the university for the specific major. This system has its pluses and minuses. The positive side is that the university has greater control of what students are studying, and is able to create the specific course sequence that would insure the most efficient progression through the courses. The negative sides of such system are that it is very difficult to introduce new courses into a set curriculum, and students are unable investigate more deeply the areas of their particular interest by taking additional courses in other departments. However, in recent years educational reforms have led to including several elective courses in the usual set curriculum. That change somewhat lessens the negative effect of the system by giving the students a chance to choose classes in areas that they are more interested in, and also by allowing for an easier introduction of new courses.

The architecture curriculum in Russian universities is defined by the State Standard of Education. The curriculum takes five and a half years to complete, where first five years the students take courses in the university and then from September through February of the sixth year they work on a big "diploma" project under the supervision of assigned faculty advisor. The classes taken during five years include several core courses, such as Russian, history, philosophy, calculus, foreign language, sociology. Then there are several engineering courses: geodesy, structural mechanics, metal, wood and masonry construction systems design, methods of construction, environmental control systems (focuses on conventional mechanical systems taught by engineering departments); as well as art courses: history of art, freehand drawing, watercolor painting, sculpture. The major part of the curriculum consists of architecture courses – history of architecture, theory of architecture courses (volumetric-spatial composition, theory of city planning), and design studios. The sequence of architecture design studios takes the student from learning how to create technical and presentation drawings through designing simple one-story commercial buildings to the design of multistory mixed-use complexes.

At present the only course dealing with environmental aspects is ecology. At the South-Ural State University, where I have received my first architectural degree, it is a short course (one and a half hours per week for one semester) that is taught to architecture students by

Department of Architecture faculty during the first semester of the fifth year. The course provides students with some background on general ecological issues and then focuses on reclaiming abandoned mining sites, which are quite common in the region, for use as recreational parks.

The opportunities for the multidisciplinary approach are limited to occasional cooperation with architectural engineering students in the design of the building structure, or using Design studio project for the ECS assignment, and consulting with the engineering departments in design of mechanical systems while working on the final “diploma” project. All such work is always done within the Architectural-Construction Faculty (administrative part of the university that includes the architecture department and several engineering departments related to construction industry).

Based on my understanding of Russian educational system, I propose to integrate issues of sustainability into the university curriculum in several stages. The first stage would consist of adding to the existing courses: guest presentations in the first- or second-year design studios, which introduce students to sustainability; integration of ecological issues into design studio projects; and a series of lectures within the History of Modern Architecture course. Some effort also should be made to integrate learning passive and active solar systems into ECS course. That could be achieved through series of guest lectures integrated into the class. Then, using current addition of elective courses, a specific lecture-seminar course on sustainable architecture can be introduced for the most interested students. Some students can also expand their knowledge in environmental design while working on their final project¹. That way some of the key elements would be integrated into architecture curriculum: students are introduced to the issues early in their studies, the exploration of them continues throughout their education and they have an opportunity to get an in-depth knowledge of the applicable strategies and methods.

Of course, that would be only the first step on the way to “greening” the curriculum. Later on, the whole architecture curriculum and all the courses should be revised to integrate the issues of sustainability. That would require collaboration with interested trained faculty throughout Russia and possibly creating a Russian chapter of the Society of Building Science Educators. Same changes should be done in all the other departments of the university providing wide basis for truly multidisciplinary and holistic approach to understanding and preserving the complex environment we all live in.

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¹ As part of my Master’s thesis, I am working on developing syllabus for the elective sustainable architecture course and guidelines for integrating sustainability into design studio project. The work will be completed by the start of the conference and I will be glad to share my findings.

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