

Architectural Education: Processes, Resources and Strategies

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Abstract—Nowadays, as never before, the architectural education demands deep knowledge of regional culture, its heritage as spiritual and material identity of the regions of country. The state of the system of the architectural education is defined both with objective characteristics — in the second half of the 20th century and in the early 21st century, mainly, with architectural schools of Russia, and with those novelties which engulfed all the system of high education in the country. The present-day set of goals of the architectural education and its key part, such as project works, fluctuates within the field of searchers of waymarks in practice and research. The self-development of the architecture is a process which is considered as an inner professional matter, but it reacts at the processes and provides resources for the architectural education, in general. Education is a system-making foundation of the architectural occupation under the terms of differentiation of the forms of work of planners, and rooting of the principle “education for the whole life-period”. The development of education supposes solving some tasks: organizational, methodical, creative, and research ones.

Keywords—architectural education; resources; processes; strategies; contemporary Russia

I. INTRODUCTION

The radical change of the paradigm of the development of Russia in the late 20th~early 21st centuries, which accompanied the transformation of the social and political system, shaping the private property and market relations, reforms of the forms of life and activity of the population, destruction of the ideological monopoly of the Soviet state, produced numerous changes in the sphere of the architectural trade: from education and research to practice of planning and project-making and construction works. Nowadays, as never before, the architectural education demands deep knowledge of regional culture, its heritage as spiritual and material identity of the regions of country, and it takes them for as for waymarks. Deep studying our history gives us possibility to understand its regularities and peculiarities in the context of regional culture. Historical knowledge helps us to understand the present and the future.

II. STATE

The state of the system of the architectural education¹ is defined both with objective characteristics — in the second half of the 20th century and in the early 21st century, mainly, with architectural schools of Russia, and with those novelties which engulfed all the system of high education in the country.

The contemporary architectural education in Russia includes more than 70 architectural schools², and they shape the educational space covering 51 cities.

In Moscow, high architectural schools are presented in 11 educational institutions; in St. Petersburg and Astrakhan — in 3 institutions; in Kursk, Novosibirsk, Rostov-upon-Don, Tiumen, Cheliabinsk, Yaroslavl in 2 institutions in each city. Some other cities of Russia have 1 such institution each, providing professional training in the frames of the state courses “Architecture”. In the European part of Russia, there are 53 high schools, in the Urals — 4 ones, in Siberia — 11 ones, in the Far East — 3 ones.

If we take into account the distribution of these high schools among the federal districts of Russia, and the correlation of the quantity of population with the quantity of such schools, the results are the following:

Far Eastern FD – 4 – 1.50	Central FD – 25 – 1.56
Siberian FD – 8 – 2.4	Volga FD – 10 – 2.96
Ural FD – 8 – 2.05	Southern FD – 8 – 2.05
Northwestern FD – 6 – 2.3	North Caucasian FD – 3 – 3.26

Thus, there is one high school at 1.5–3 million of population, i.e. there is certain uniformity for the general quantity of the population of each region.

Joining of Russia to the Bologna Process in 2001 defined a transition to the two-step system of architectural training — bachelor’s degree and master’s degree. Since September 2018, the admission to the high schools has numbered in

¹ The author uses the concept of “architectural education” to unite both the developing construction training, and design schooling in the institutions of high education in our country.

² We give the qua “Architecture”.

4950 students to the first year of the bachelor's step, and about 1750 — master's step. Three high schools only (St. Petersburg State University of Architecture and Civil Engineering, Kazan State University of Architecture and Civil Engineering, Voronezh State Technical University, Volga State University of Architecture and Civil Engineering) offer admission to the bachelor's and master's steps in all four qualifications of training (architecture, civil engineering, environmental engineering, restoration and reconstruction of the architectural heritage). In other high schools, there are only some of these qualifications.

In general, the activity of high schools is characterized with two trends: traditional educational-methodical and novelty-searching ones.

Views of supporters of novelties are often shaped into rather wholesome concepts embodied inside their chairs and departments, or manifested in independent educational structures. Renovation of methods often takes place inside certain schools, providing some "hybrid" methods. Such processes are not always connected with administrative actions aimed at the opening of new qualifications, faculties, and departments in the structure of existing universities of this or that profile. Since 1980s (when architectural high schools were created by order in Rostov-upon-Don, and Novosibirsk), architecture, civil engineering, restoration, environmental architectural design have been attractive qualifications both for academic milieu, and enrollees.

From the point of view of financial support, the system of high education in Russia consists of state high school with rare commercial institutions.

Unification of high schools, which takes place in Russia during several years, led to the situation when architectural and civil engineering universities, and academies were included into federal, national research, technical, and polytechnic universities, where architectural faculties had been formed. It provided the interaction between architectural schools and administrative-methodic structures, forming new terms of training of future architects in a new interdisciplinary milieu.

In parallel, the proportion of teachers and students was changed, according to the road map confirmed by the government of Russia.

III. PROCESSES

The current state of aims of the architectural education and its leading component — projects making — fluctuates in the field of searches for signposts both in practice, and in research [1].

The architectural education is not always synchronized with contemporary architecture. It can move faster or slower, taking into account the outlines of the heritage of previous epochs, and longing to anticipate the future.

What processes have an impact at the development of the Russian architectural education?

- The transition process in economics to the principles of the global strategy of stable development.
- The transition process to the post-industrial state through the third and the fourth industrial and technical revolutions, which radically change traditional ideas of the character of architectural and civil engineering activity.
- The process of development of the foresight-prognosis in economics, prognostic modeling of the shapes of the environment.
- The process of coming of the "gadgets" generation' with its developed gamers, clip perception, and the development of online-education.
- The transition process in some professional occupations to distant work, freelance, and networks.
- The process of expansion of professional borders of architecture, manifested in the situation, when pre-project component includes more and more evaluation — rating as well, increasing of forms and quantity of presentations. Financial-economical explanation of various scenarios of implementation, social effects, life-cycles of an object force participant of the process of modeling and construction to improve and to synchronize their actions.
- The process of strengthening of the business impact at the modeling and construction activity.
- The process of building integration of an order. Interests of investors, clients, and city communities to future changes of the environment lead to the demands of broadening of pre-project procedures. It is necessary to take into account, that contemporary social and economic prognosis is a full-scale component of all project works.
- The processes of standardization are completed both the activity of architects, and the architectural education. We see, what a big interest is manifested by the state to introducing professional standards in all spheres of activity. Their quantity is growing, and it is significant. These standards should be laid in the basement of educational standards, according the acting documents. Thus, the current understanding of the professional occupation as if determines the components of the basis of the education. There are more soft formulas: that the educational standards are being built taking into account professional standards.

A certain professional standard is designed for people and activities actual at the current moment. I.e., professional standards are documents oriented at the practice. They provide the current activity.

IV. RESOURCES

The self-development of architecture is a process, which is considered intraprofessional, to some extent it reacts at all

the processes mentioned above and acts as a resource of the architectural education.

The technologies of organization of human activity and industrial technologies (3D printing and others) make architects more deeply delve into the complex of problems of its (vital activity) spatial organization; for example, when using the technologies of the “smart home”, “smart city”, and “smart settlement system” [2].

The information infrastructure not only becomes a full-fledged element of the resettlement system, a powerful service-oriented city-forming component of settlements, the vital nerve of each megalopolis, working for its safety, comfort, and efficiency, but it also affects at the forecasting of their development, scenarios of their spatial organization, and provides continuous monitoring the vital structure of the “smart settlement system”. Thus, the infrastructure performs the functions of a resource in the process of project making and at the stage of the educational activity.

The contemporary technologies of modeling and construction make it possible to create objects and integrate ideas about any forms, using the means available to almost every project structure regardless of its size. The development of network forms of interaction makes it possible to connect almost planned resources for solving one or other project tasks, if they are supported by corresponding economic maintenance.

For the first time in history, an Internet resource acts as a basic information resource, covering data on the achievements of practice, research, and education.

The basic research and methodical resource of the architectural school is the pedagogical staff, integrating the efforts of teachers-methodologists, lecturers, and designers, carrying out the joint development of educational programs of the school and the trajectory of education for each student, depending on his or her level: bachelor, master, postgraduate.

The fundamental resource is the research schools of high educational institutions and the Russian architectural research community, and the ever-growing body of the knowledge accumulated by them [3], as evidenced, for example, with the list of thesis published through over 25 years of the new Russia (more than 800 Ph.D. and more than 110 doctoral theses) under the patronage of the Federal Educational Methodical Union “Architecture” [4].

Nowadays, the positioning of research in high architectural school covers a wide thematic range of the three main types:

- fundamental research in the field of history and theory of architecture, civil engineering, design, typology, and education;
- applied research in these areas, as well as analysis and synthesis of new educational technologies in the context of the progress of engineering systems, and the design of buildings and structures;
- project-experimental development as an implementation stage of the first two types of studies.

V. STRATEGIES

From the mentioned above the requirements for the architectural education follow; they determine shaping of its strategies. They are basically not the requirements of practice, as before, but the requirements determining future practical activities [1].

What is the basis of the actions of architect, city planner, and designer?

They are challenges!

Key challenges of the present and the challenges of the next decade [5] [6] define the meaningful goals of professional activity, and vectors of movement of the architectural education.

Therefore, education strategies today include the foresight search for the forms of organization of educational, scientific, design and practical activity. Let's try to formulate their basic schemes.

The first is a traditional one: the two-level education — bachelor degree — master degree and — postgraduate — doctorate steps. Under this scheme, educational innovations are embedded in the activities of traditional structures that carry out educational activities: faculty, departments, and workshops.

The structure of the university is aimed at the implementation of the educational function (University 1.0).

The second is a search, cluster one: the two-level education — bachelor degree, faculty of advanced learning, additional professional education project section — master degree, faculty of advanced learning, additional professional education project section — postgraduate studies — doctorate — research school — faculty of advanced learning.

It uses the cluster structure of the university and shaping the process of its activities on the principle of the university 3.0 and 4.0. In such a structure, the sequence of educational stages remains, but the structure of the university changes. The university 3.0 and 4.0 includes an architectural cluster consisting of educational, research, and project elements. Their capacity varies with the scale of the tasks being solved, but the essence is the continuous connection of all three fundamentally unchanged.

The university 3.0 assumes the creation of an integrated entrepreneurial ecosystem on the basis of universities, in which universities become key contributors of innovation.

The third scheme is hybrid. It is based on a combination of the first and the second circuits in various proportions and arrangements of elements.

How is the learning process organized in terms of its goals? It is important to remember the lessons of the past.

First of all, it is VHUTEMAS — VHUTEIN: “The adherents of the avant-garde art center who came to that university, developing and introducing new educational methods, didn't just hiccup new forms of teaching students professional techniques and means of artistic expression

(they did not exist either in the new architecture, or in their design), and they developed those skills and tools in the course of the learning process” [7].

It is likely, that today there are similar opportunities. They are provided with the structure of methodological installations, based on the Federal State Educational Standards 3 ++, the corresponding approximate basic educational programs, and vectors, which direct education to the training of professionals in their future skills.

Professional standards, as noted above, are by definition practice-oriented documents, basic requirements, norms, and regulations. Today, the Federal State Educational Standards will fill the field of the regulatory support for educational activities — they are foresight-oriented standards, that is, they are standards oriented to the design of the future.

It is the foresight component in them that is leading. At the same time, the ratio of what should be in the base, what should be preserved, necessarily present in professional activity and what should be updated, replenished with new demands, acquires exceptional importance. A kind of combination of universality and uniqueness is it.

Nowadays, certain answers of the humankind to the global challenges that accompany the life of the planet have been found: climate, changes in the economy, technology, etc. — contributing to the implementation of sustainable development strategies. A number of changes led to the emergence of climate doctrines, awareness of the possibility of the atmosphere breaking down by the greenhouse effect — these answers as human life strategies should be formulated as certain requirements that one should know, be able to answer on them, and to have skills to implement in the relevant field of activity in any future professional occupation.

The standard framework defines the number of years of study, as well as the number of hours per week; and for the first time their range is set. A teacher is not strictly regulated by this standard, as it was earlier by the standards of the second generation. As for the approximate basic educational program, this is the document that contains the fundamental component.

It is important to pay attention to the fact that the architectural education is elite in a number of signs, when implementing the requirements of the approximate basic educational program and developing programs of architectural school. Therefore, we give these signs.

“Elite (elitist) educational institutions differ from the usual ones:

- with the selection system: not with some kind of artificial, but of natural selection” (as revealing certain qualities inherent in the future creator, — GE);
- with a special mode of study: hard and tense;
- with teaching all subjects at the high level of difficulty... when a student is required to reach the “edge of the unknown”, when a student must

understand in detail, that “this is known to science, but that is unknown” [8].

“...In the process of studying in an elite educational institution, no distinction is made in the terms of “degree of importance” between natural science, technical, and humanitarian disciplines. Everything is equally important!

...under the new social and economic conditions that require every person independence in choosing a profession and changing it, in the search of work, or in the general responsibility for their own destiny, the role of humanitarian education, shaping the breadth of the circle of views, flexibility of thinking, citizenship, and spirituality, increases more and more” [9].

So, the approximate basic educational program is the changeable part of the standard, which is interpreted as a mechanism ensuring the action of the Federal State Educational Standards 3 ++, as development standards.

The following principles for the development of basic educational programs are proposed:

- a synthesis of engineering, social, humanitarian, artistic, and aesthetic foundations in the project making;
- adaptability and flexibility of educational programs, which are achieved due to the modularity of curriculum construction, taking into account the basic resources of architectural schools and a possibility of constant updating of the content and individual disciplines. Practice-oriented and foresight-oriented programs provide the vectors of PC (professional competencies) and RPC (recommended professional competencies);
- traditions of educational organization, human resources, research, and innovative methodological development as resources for the architectural school;
- evaluation in the State Final Attestation as an assessment of the level of achievement of indicators — indicators formed on the basis of criteria for assessing the level of PC formation.

What modules — not disciplines — should be mastered, who will read, and so on. We (the developers) insist on preserving the form “Master (Teacher) — Student” in training in the sphere of design and art disciplines and modules. Of exceptional importance for architectural design projects is the development precisely in the contact, dual interaction of Master-Teacher and Student.

The study of the modular approach in shaping the structure of the educational process in the “Architecture” areas can be carried out as follows.

Based on the three-part structure of the content of the architectural education — an integrating block (project design), a humanitarian block, an engineering block, an artistic block — the usage of modules can be based on the following scenarios:

- the modules correspond to the blocks and are arranged sequentially throughout both levels of education (bachelor, master);
- the implementation of each block is carried out in disciplinary and hybrid forms.

In the undergraduate (bachelor) course, it is imperative to master the methodology and project design as a profound professional qualification, which forms an understanding of the basic meanings of architecture and the activities for its creation.

It is possible to use a hybrid system for building an educational process, a combination of disciplinary and modular schemes with the inclusion of research elements in each one more widely than it was previously accepted.

These approaches, while being declared normatively, will ensure a possibility of preserving the identity of each school, a possibility of preserving and transmitting accumulated traditions and filling them with new content, which actually opens the way for the inclusion of innovations. The search for the optimal combination of online and offline courses, the admissibility of digitalization measures in architectural education, especially at its initial stages, is of paramount importance.

How to implement a hybrid modular discipline form? In particular, at the Moscow Institute of Architecture and Civil Engineering, over the past three years, we have rebuilt the master's programs. Nowadays, the educational process on the Master level consists of four parts. This is a semester scheme, in which each semester is divided into three components. Throughout the course of three semesters, the discipline "Research and Project Design" goes as a whole in the department chosen by the undergraduates. This discipline is supported with the modules, the educational process in which is carried out by the university component. The whole process consists of three parts: each week is divided into three components. The students spend two days at the department, two days at these university support courses on fashion (there are nine of them according the content) and two days at the self-study. So, we provide an opportunity for contact work with a teacher at the department, an opportunity for university-based concentrated lectures and practical support, and an opportunity of independent thinking, making decisions, and educating themselves. Using such a hybrid form, we provide a qualitatively more effective level of education, as evidenced by student surveys.

VI. CONCLUSION

Architecture is always a unity of innovations (which can have a universal character) and heritage (unique, many-sided, preserving the culture of nations, being the material embodiment of their identity at every stage of history). Therefore, along with its universality, local variants of architectural cultures will also be developed. This is the exclusive role of regional architectural schools. Such an expected course of events shows that the architectural educational space will include all new areas, relying on the culture of certain regions, integrating the diversity of ideas

about human life and society, combining the global and the local aspects, giving the general forecast, and accenting local peculiarities.

Education becomes the backbone of the architectural profession in the conditions of differentiation of the very forms of work of project makers and the rooting of the principle "education for life". The development of education involves the solution of a number of tasks [10]:

- "Organizationally": they are in search of the optimal construction of the master level as an institute of high professional architectural, civil engineering, design, and restoration training, forms of organization of additional education and advanced training as processes of clustering education;
- "methodically": development of educational methods as creating a field of project making (scenarios, models, forms) of the living environment, and developing models of the spatial organization of the future life of mankind;
- "creatively": solving the problem of social harmony, ecological balance, artistic diversity in terms of cultural identity;
- "from the research standpoint": it is the development of new methods for designing the future living environment, and adapting the environment to the current challenges based on comparative — multidisciplinary — interdisciplinary (convergent) research.

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