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INTEGRATION PROBLEMS FACED BY FUNDAMENTAL SCIENCE AND PROFESSIONAL TRAINING IN MODERN PROFESSIONAL DEVELOPMENT

Statement of the problem. In today's reform of the organizational structures of research centers and the national system of vocational education appeared problematic situation associated with an unclear idea of what would become the ideological and logistical basis for the development of the industry in fundamental and applied sciences. It is necessary to develop a concept to solve this problem, taking into account the features of the current state of the industry.

Results. The author's concept of academic integration of basic science and modern vocational education system, which can be subject to a number of changes in the legislative framework is suggested.

Conclusions. Based on the proposed concept a model of integration of academic and university science in several respects is designed. A cooperation program is proposed to be designed where each of the objects will be given a role considering special features of the rules of a particular activity. These could be the formation of centres for cutting-edge research designed based on the collaboration between scientific staff of the leading universities and academies, the organization of regional coordination scientific boards supported by the RAASN based on the universities and scientific staff, the development of the centres for technology support, scientific and technological parks, consulting firms, business centres, support of small start up innovation firms, the implementation of the schemes for employment mobility of the staff of scientific research centres, universities, design and construction firms, etc.

Keywords: basic research, architectural education, urban planning.

Introduction

Integration of fundamental science and professional development can currently be viewed in the aspect of interaction of the Russian Academy of Architecture and Engineering as a coordination centre of the industry’s fundamental and applied research and specialized higher-education institutions. In the current reform of science and education our industry is relying on a few remaining

science research centres and Architecture and Engineering higher education institutions. The ultimate goals of the ongoing reform of science and education remain unclear but what is obviously clear is that the systems of organizing fundamental research, applied regulation, law support and professional training that have been used for decades before can be seen declining.

There is pressure to develop a unique outlook into the future, which seems rather uncertain, based on our own ideas of the industry, logics, reasons behind change and balance it against our perceptions of the benefits of the professional, intellectual, organizational and financial potentials.

Innovative society these days involves designing an economics largely based on the generation and spread of knowledge [1]. The major role in the production of professional knowledge is played by science and education institutions whose job it is to nurture and encourage future specialists.

There is no denying that the level of funding and development of science in Russia puts it way behind the developed countries. Even in developed countries it is the government that is the major investor in academic science that uses the budget to make up for business' lack of participation and failure of tax policies and legislation to deliver support to science, education and innovation [2].

The current problems of science and education associated with a decline in public funding, no demand for scientific knowledge and high-skilled specialists and the government withdrawing from the responsibility to deliver that this country is facing are beyond the scope of discussion of this paper. But these are in fact the major causes of Russian universities not engaging in scientific research and according to the Ministry of Education, there are declining trends [3]. These are commonly tackled by the government not by financially supporting universities but by shutting down or merging them. No universities means no problems. Architecture schools in Rostov, Krasnoyarsk, Ivanovo, Irkutsk and Moscow have been affected by the policy. Industrial scientific research centres that found themselves shut down from the Russian Academy of Architecture and Engineering as a result of the opening of a new ministry of engineering and housing and communal services are equally struggling.

1. Ways of addressing the current negative trends in architecture education and science. There is one question being asked which is: what is there to be done to address the current trends? There are certain ways and ideas that can possibly be taken aboard.

First, a new legislation needs to be developed to make the current science and education legislation comply with the laws pertaining to other industries. For that, the current legislation needs to be revised regarding taxation of science and education to encourage professional engagement.

Secondly, the state policy should be about fostering the integration of science and education. This would enable universities to engage in unique and possibly ground-breaking research supported technically and financially to help science to be on the same par as education. This would involve the legal consolidation of a special relationship between science and education to enable universities to compete for research grants. This kind of policy needs to be on top of the priority list.

Thirdly, changes are to be made to the principles underlying the public and private funding of scientific research in academies, scientific research centres and universities to make the best possible use of the funds for a newly integrated science and education environment. The above suggests that the legal aspect is to be changed first to set the stage for the integration.

The Russian Academy of Architecture and Engineering developed and published a paper titled “Predicting the Development of Fundamental Research in Urban Architecture and Engineering up to 2030” [4] detailing a comprehensive list of scientific areas that the country’s housing and communical services are currently in need of. The topics listed in the paper can presently be adopted by universities in an attempt to design their own academic research outlook regarding certain training courses such as the theory of architecture and urban architecture, sociology and economics of urban architecture, architecture management, environmental issues in architecture and urban architecture, conservation of architectural heritage, basic restoration and reconstruction of architectural monuments, etc. These predicted trends can be used as a basis for Master and PhD thesis, plans designed internally in research laboratories of universities. There is nothing new to be said about how the research topics are designed using the current educational programs of universities but what seems to be an issue now is that professors and lectures are exercising discretion in designing those topics with no programs regulating the interaction of fundamental science and education to comply with.

2. Modern domestic architecture training. Another issue worth mentioning is the way the ongoing reform of education is tackling redesigning of the previous system of professional training. A traditional system of a 6-year one-level professional training which dates back to

the Soviet era and has proved to be effective since will no longer be in place starting 2016 following the Bologna Process and a new education law coming into effect. The structure of the professional training is being completely revisited making it into a tertiary system: bachelor — 5 years, master — 2 years and postgraduate — 3 years. Each of the stages involves training employing research putting the scientific method at the heart of competence training. There has been a dramatic shift in the priorities and objectives of training. We no longer seek to train designing architects to deal with static architecture. Designing has seen a major change and is now embracing design strategies, diversity, flexibility of decision-making involving the dynamical changes in time. Based on that, there are studies into the future properties of structures being designed to take the best advantage of the modern technology on the one hand and viability to keep up with the current social changes taking place on the other. Therefore, the objectives of professional education are the following: “training of competent, creative, critically thinking, intellectually mature, environmentally aware, socially engaged and ethically nurtured qualified designers and architects” [5].

In our discussion of the interaction of the global and university-level academic science, we cannot fail to mention the features that the implementation of the state educational programs involves. Particularly, according to the state approved education standards (ФГОС) [6], certain areas that were previously missing or of less importance are recommended to be addressed as part of professional training.

For example, these are the following:

— theoretical research of architecture and urban architecture, including the functional, construction, engineering design aspects, building typology, accessibility for less mobile population groups;

— development of scientific foundation for promoting a healthy and comfortable living environment with the best workplace and housing conditions based on the physical and technical designing principles;

— research into theoretical problems of architecture and urban architecture for new and improved design and planning solutions to deliver on functional and esthetic needs of today;

— research into social, technical and management problems of the sustainable development of architecture and urban architecture, etc.

It is worth noting that the introduction of scientific research in the current education landscape is defined by the pressure to develop a range of professional competences in undergraduate and postgraduate students specified in the program. A student is not just an individual being trained (or supervised) by a teacher. These days both are partners dealing with scientific problems at a required level.

Another important part of scientific research are the materials used in final bachelor, master and postgraduate exams. All university leavers carry out an independent scientific research followed by public defense of their papers. The requirements for the volume and quality of the final materials are compared to those for professional scientific reports of special institutions.

Architecture training in this country is held in high regard both domestically and abroad. To prove that, there are low unemployment numbers and thriving careers newly-qualified architects pursue in architectural studios of Germany, England, the USA, Spain as well as the validation of domestic education programs by the International Architects' Union and the UNESCO. There are more professional training and retraining programs being made available in universities abroad where students do not feel disadvantaged and can continue with their studies and employment.

Therefore, today universities are becoming scientific research centres that are capable of delivering results and benefiting the country. Current changes are making universities compelled to engage in the development of strategic research programs, their coordination, research expertise and independence and recruitment of outside specialists to deliver high quality of supervision and training.

Conclusions

The integration of academic and university-level science involves the development of cooperation programs where each of the individuals involved will be given a role to play as specified in programs. These could be:

— more extensive recruitment of scientific and teaching staff into education and science;

— design of centres for cutting-edge research based on the collaboration and cooperation of the leading university and academic research teams and funded on a competitive basis;

— development of scientific educational centres, fundamental (cooperative) departments and educational research laboratories (both in universities and scientific research centres);

— involvement and engagement of talented youth in science and education, provision of large research grants to young scientists and university teachers;

— organization of regional interdisciplinary coordination boards for scientific research based on the Russian Academy of Architecture and Engineering functioning with the support of universities and employing scientific staff to work in their departments;

— creation of joint specialized scientific degree committees based on universities and scientific research centres;

— creation of technology transfer centres, science and technology parks, consulting firms, business centres, support of new small innovation businesses;

— implementation of employment mobility schemes for the staff of scientific research centres, universities, design and construction companies.

Some of the above is already being implemented based on new scientific research universities, cooperative and private initiatives but there has not been a single way to address the integration of scientific and education centres. It is thanks to the legal foundation that these structure and partnership programs emerge but no legal foundation means there are certain amounts of calculated risk involved in running them.

It is our responsibility now to seek new ways of integration to enhance and nurture professional training and to maximize the efficiency of public science funding.

The alienation of science and education does nothing but hinder the development of both, compromising their contribution into transforming the economy and society and prevents the inclusion into the global science and education systems.

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