Educational cluster as the element of Russian professional education system

Evgenii Alexandrovich Korchagin, Rais Semigullovich Safin, Ilfak Elfikovich Vildanov, Runar Nazilovich Abitov

Kazan State University of Architecture and Engineering, Zelenaya Str., 1, Kazan, 420043, Russia

Abstract. In the article it is considered the educational cluster as the element of continuous professional education system. It has been revealed that the educational cluster has potential for continuous education problems solving. Developed education plans and programs, in the scope of continuous professional personnel training system, make it possible to optimize the formation and development of person's professional and educational potential during the whole labor activity. Integration of educational institutions inside of the cluster into uniform system makes it possible to confirm the standards connecting outcome of lower ranked educational institutions with higher ranked ones. The activation and usage of youth creative potential in the scientific and innovative activities occur in the conditions of educational cluster, which contributes to changes of innovative economics quality as a system. It has been identified the fundamental principles of educational cluster.
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Introduction

Nowadays, one of the problems of Russian professional education is mismatch of workers and specialists trainings quality with requirements of industry. For the current problem solving, from the many specialists' point of view, it is necessary the collaboration of education and manufacture which in its turn requires new forms of professional trainings organization in the educational institutions. Nowadays it is observed the tendency of Russian educational institution consolidation, branch association of professional education institutions, realization of educational programs of multilevel professional education established by the new law "About education in the Russian Federation". Along with being conducted organizational and structural changes it is required meaningful reorganizations in the system of workers and specialists trainings as well as search of new forms and methods of education. The international processes, one of them is formation and development of educational clusters, are done on the bases of differentiation and individualization of professional education [1].

The theoretical bases for educational clusters creation and development are: cluster approach toward professional education; theories of activities and instructional design; concept of continuous education; researches revealing problems of social and private-state partnership and education quality management at the professional school [2-6].

Main part

Today, it is observed the transfer of elementary and secondary professional educational institutions to the regions. By the authors' idea of development, the regional educational system must be presented as a model, fulfillment of which must be done through social partnership including educational institutions. It will be effective in the conditions of educational cluster, if all the levels of education inside of one field will be in the successive collateral subordination on the bases of end-to-end educational programs, the educational programs will be created taking into account requirements of professional standards, developed by field representatives, institutional groups and manufactures will collaborate on the bases of corporativity principles [2-4].

Cluster (derives from "accumulation") – consolidation of some similar elements, which can be considered as an independent unit with certain characteristics [2]. Cluster symbolizes intention to build "common yard" for workers and specialists training, being able to make Russian economics more competitive. The educational cluster is aimed to combine efforts of professional educational institutions interconnected by field indicators with field industries into integrated space. The practical implementation of the idea about educational cluster was obtained thanks to government interference into the relations between education and manufacture for solving problems of educational institutions financing, enhancement of practical and oriented direction of professional education through approaching it toward manufacture fulfilling labor resources of the country.

During the last some years the concept "cluster" has obtained its definition, which common essence comes to the following: the cluster is an industry and geographical concentration of

institutions, close connected fields, mutually contributing each other competitiveness growth [1]. From the other side, nowadays, the concept "cluster" has the meaning of geographically combined and interrelated companies groups and related to the them organizations, acting in certain fields, characterized by community of activity and mutually complementing each other. Such an approach gives opportunity to mark out different types of cluster, including educational. At the same time in the literature it is found different interpretations of "educational cluster" meaning. Not stopping on those interpretations, we will mark out that from our point of view, the educational cluster – it is a system of vertically (with the aim of competent specialist forming) and horizontally mutually connected professional educational institutions and manufactories united by industry indication.

In the educational cluster all the subjects participate and regulate multilevel system of workers and specialists training of the required qualification. The employer identifies what to teach, the educational institutions – how to teach and the professional education is considered as a process, in the bases of which it is lies integration with manufacture. At that, the time spent on workers and specialists training asked-for by manufacture and the period of their professional adaptation are decreasing.

For the employer as the customer of educational services, the educational cluster is a factory of complex practical and oriented knowledge which makes it possible to identify areas of priority investments.

Integration in the educational cluster is understood not only as formal integration of different structures of famous triad "education – science – manufacture", but finding of new form connection of their potentials with the aim of reaching synergetic effect in the solving of set problems.

In the educational cluster the priority is given to institute of higher education among all the educational institutions. In the structure of educational cluster, secondary professional education is also being introduced. Thereby, in the cluster a student has an opportunity to obtain any qualification after each stage of educational process [7]. So, the student of the professional college gets an opportunity to obtain higher education by the shorten program at the expense of interconnected plans of higher educational institutions and college.

The educational cluster has a potential for problem solving of continuous education. Developed educational plans and programs in the scopes of continuous professional labor training system creation give opportunity to optimize the formation and development of person's professional and educational potential during the whole labor activity.

At that, the opportunities of "individual educational path" building by a student are substantially increasing. Integration of educational institutions into a common system gives opportunity to confirm the standards which connect outputs of one educational institutions (of lower rank, for example, technical school) with another (higher rank, for example, universities) [8]. Activation and usage of creative potential of youth in the scientific and innovative activities occurs in the conditions of educational cluster which contributes to changes in quality of innovative economics as a system.

The manufacturing enterprises are presented in the structure of educational cluster identifying development of the educational system. The cluster does not develop without interconnection with manufacture. The education cannot exist without manufacture. The system should place its graduates in a job, get offers from manufactures on forming new competence from workers and specialists being asked-for by new manufacturing conditions. Innovations do not get accustomed and the manufacture does not develop without interconnection with educational institutions as innovative workers and specialist are getting ready in the system of professional education [10].

If the secondary professional institutions do not participate in the cluster that means it is not taken into account the supply of manufacture with qualified labor, middle level specialists. Such an approach excludes opportunity of workers' continuous education and improvement of their qualification. The mentioned disadvantage can be excluded by creation of industrial educational clusters.

In the process of personnel training with different level of qualification, the educational institutions of professional education with different level interconnect with each other, with manufacture, business and science. That gives the base for marking out the industrial educational clusters.

The educational clusters are built in the following fundamental principles: self-organization, systemacity, integrity, synergism, openness, interaction, corporativity, feedback, formation of common informational space and improvement of staff qualification [9].

1. The principle of cluster *self-organization*. In is known, that during the last years, in the country it is hardly felt the deficit of highly qualified workers and specialists. The employers mention insufficient level of labor training quality at professional educational institutions. It is still an actual problem of integration of professional education system, science, business and manufacture. In that period, the self-

organization of educational clusters has become quite modern by initiative "on top". It has been created conditions for cluster structures self-organization that eventually, increases competitiveness of professional educational system.

The educational cluster, as a self-organized system, is able to change external and internal conditions of its existence. Thus, depending of labor demand factor in the field of national economy it is possible further growth of cluster number. Nowadays, there are clusters in petrochemical, construction, aircraft construction and other industries. Clusters development also depends on its placement, development of regional transport scheme. That makes the educational clusters attractive also for university entrant from other regions.

Improvement of internal structure of education system, implementation of modern learning technologies, attraction of industry leading specialists to conduct the lessons increase quality of specialists' trainings.

2. The principle of *systemacity*. Systemacity in the conditions of educational cluster is related to analysis and synthesis of relations in the system: "science – business – manufacture – education", "industry development forecasting" – professional education development forecasting", "human – education – occupation", "government – ministry – industry – professional education" and etc.

During the planning of continuous professional education system it is taken into account the logic of educational disciplines: fundamental, humanist, general professional and specialized.

The principle of systemacity appears in the unity of interdisciplinary and systematic approaches toward projecting of educational process, synthesis of theoretical and practical preparation, in the unity of educational and manufacture processes, their subsystems and components.

The "educational cluster" system consists of subsystems, such as "SPE system", "HPE system", "basic manufactures" system and etc., which can be considered as systems.

As it is known, in the system projecting, the stress is done on the synthesis of various connections and relations both inside the object (educational system of continuous professional education), and its interrelations with the environment (industrial enterprise and organizations of Russia, Russian educational institutions and etc.). The usage of synthesis method brings to the integration of many aspects and indicators into the whole unit, to complex structural and functional system of connections and relations in the cluster.

The principle of systemacity gives opportunity to set and realize interaction of continuous professional educational system with educational environment, to reveal possible regularities and development of the educational process components, to identify framework connections in the system "industry – manufacture enterprises – industry educational cluster – educational process".

3. *Integrity* principle. The systemacity provides integrity of creation and interaction of the separate systems of industrial educational cluster (secondary, higher, additional education; general education, general technical education, professional training; theoretical and practical education; learning, learning and professional, learning and manufacturing activities). The principle provides interaction of socio-economical, science and technical, phycology and educational community of all the manufacturing elements, in the science, technology, business, education.

4. The principle of *synergism*. The principle means that the evaluation value of the whole object (of the educational cluster) equals to sum of the evaluation values of its separate parts. The continuous educational support, based on innovative interaction of the separate educational levels, horizontal integration of educational, scientific, manufacturing structures is able to give positive synergetic effect in terms of competitive workers and specialists of manufacturing industry.

5. The principle of *openness*. The educational cluster is an open system. The number of participants of the educational institutions, manufacturing organizations, enterprises and companies can be changed during the cluster work. The cluster interacts with the environment. For example, during the development of new building materials the building educational cluster can attract higher educational institutions of petrochemical cluster and etc. to scientific researches. In its terms, the building cluster can pass the information to other clusters (mainly, can have direct and backward communications).

6. The principle of *interaction*. The successful cluster functioning is impossible without close interaction of its participants.

Interaction and integration of different levels of professional education (SPE and HPE) gives opportunity to specialist providing carrier growth during qualification improvement within shorter period, comparing with continuous education on each level. Besides, on each level of education there are opportunities to attract teachers with higher qualification.

The cluster specification is free and partially involvement of any infrastructural components of participants into each other (department branches on manufacture, usage of manufactures material base

during the laboratories renting, organization of production practices on manufactures and etc.)

7. The principle of *corporativity*. The successful functioning of educational cluster is possible while establishing communicational culture between them, while revealing common system of values for all the cluster partners, examples of behavior and ways of evaluation of activities results.

The formed culture and climate of trust in the cluster contributes to cooperative education, transfer of information to each other, joining the resources. That is why, the managers of the cluster participants pay serious attention to interrelations not only inside of their organizations but interrelations between other organizations. As a result, the established trust level with each other and mutual understanding gives opportunity to the managers for spending more time and to concentrate at his team work.

8. The principal of *feedback* provides the continuous results control of cluster participants' interaction during staff training. So, the penetration of new manufacture materials and technologies into production should be accompanied by forming of relevant competences in the educational process.

9. The principle of *common informational space formation*. While the interaction of cluster participants the new information is being produced, which belongs to all the participants and further contributes to activation of teachers and students. Thus, the educational institutions on timely bases get access to new manufacture technologies and materials in order to include them into special disciplines and educational technologies content. The novelties developed in one of the educational institutions; could be used by the teachers of other institutions; the unique systems and laboratory base of the manufacture firms and organizations can be used for laboratory classes conduction; the changes in the competences list from employer give opportunity to timely take them into consideration and to correct the context of educational disciplines; the common values are being developed.

10. The principle of *improvement of staff qualification level* in the cluster. In the educational institutions of all the levels it is possible to implement the managing staff qualification as well as workers of manufacture enterprises, organizations and firms, organization of teachers' internship of educational system at the leading enterprises.

The continuous professional education assumes realization of principle of professional educational programs continuity and integration principle of educational structures. In its turn, the realization of the current principles means that the "output" from one educational program must naturally "match" with "input" in the following. For that, it is necessary the transparent standardization of professional educational program which is based on common aims of all the continuous professional educational system.

The realization in the educational program cluster of higher and secondary professional education inevitably brings to integration of those professional educational systems, including the relations of their organizational structures, making educational cluster as a multilevel structure.

Noticeable, that the reasonability of organization of educational multilevel system is dictated as well by the requirements of modern manufacture.

The essential structural and instructive updates of higher and secondary professional education subsystems find its expression in appearance of new connection form of those subsystems, mainly identified by integration. In its turn, the educational process being limited component of educational system also is characterized by new direction in its development and appearance of new educational program connection forms.

At the same time the practice analysis of the educational process shows that the continuity of educational programs in the subsystem of education is built independently and differentially, which adds the character of certain disagreement in the aim unity achievement and the results of education. In order to eliminate the disagreement in the scope of continuity methodology of educational process, it is required in any form to establish the evaluating criteria and standardized ways of professional education communication (educational programs) in the subsystems of professional education. Those ways and criteria contribute provision of continuity and organization of educational process in the subsystems, provision of completeness of education cycles on each level of education and formation of person's motivational necessity in further stages of education.

Conclusion

The system of professional education in Russian Federation does not fully cope with the problem of provision of qualified staff asked-for by manufacture in the new market economics.

The factors of socio-economic development of the country must be creation of condition for education modernization, support and development of educational clusters which represents the community of organizations and institutions concentrated geographically, closely connected industries, mutually contributing the competitiveness growth of each other.

The cluster educational politics is characterized by that the central attention is paid for strengthening of interaction between the participants

of the cluster, with the aim of simplification of access to new manufacture and educational technologies, mutual usage of knowledge and the main funds, acceleration of study processes at the expense of concentration, continuity and integrative processes.

The cluster approach can be used for solving wide range of problems: during the analysis of educational institutions competitiveness, as the base of educational politics, as a base during implementation of the education development program, in terms of new technology of education management.

The structures, being a member of educational cluster, get the opportunity: to prepare highly qualified workers and specialists according to the requirements of manufacture enterprises; to shorten the dates of transferring the technologies on the market from the developer to the customer; to increase the level of scientific results importance evaluation at the expense of development of experimental base; to participate in the system of private-government partnership relations on the principles of project management.

Corresponding Author:
Dr.Korchagin Evgenii Alexandrovich
Kazan State University of Architecture and Engineering. Zelenaya Str.,1, Kazan, 420043, Russia

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