

RPTSS 2017
**International Conference on Research Paradigms Transformation
in Social Sciences**

**HOW TO MANAGE DEVELOPMENT OF PEDAGOGICAL
EDUCATIONAL CLUSTER IN REGIONAL SPACE?**

N.N. Davydova (a)*, A. A. Simonova (b), S. L. Fomenko (c)

*Corresponding author

(a) Ural State Pedagogical University, 620017, Cosmonaut Av., 26, Yekaterinburg, Russia, E-mail:
edscience@mail.ru, tel. +73433361608

(b) Ural State Pedagogical University, 620017, Cosmonaut Av., 26, Yekaterinburg, Russia, tel. +73433361400

(c), Ural State Pedagogical University, 620017, Cosmonaut Av., 26, Yekaterinburg, Russia, e-mail:
sfomenko2012@yandex.ru, tel. +73433361608

Abstract

The relevance of the research problem is due to the need to identify new approaches to the development of integration processes in the sphere of education, creation and active use of managerial innovations in the education system. System and cluster approaches to the study of pedagogical possibilities of the cluster as an ordered and complex object, composed of interconnected elements, are used as a basic guideline of the established scientific finding of the current system. The authors used theoretical research methods, providing a systematic analysis of scientific and methodological literature; empirical methods in the study of normative, directive and methodical documents; the modeling method to simulate the properties, structure and functions of the studied object on a specially developed model.

The article presents the methodology of the teaching cluster in the regional educational space, the management mechanisms of cluster's and algorithm's development of separate participants of network interaction. It is shown that the success of pedagogical formation of clusters is determined by the acceleration of information exchange and networking, by the facilitated access to new educational technologies, improving the efficiency of knowledge transfer processes, using intellectual, material and information resources in training teachers and conducting research activities.

© 2018 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Integration in education, networking and pedagogical cluster, development of subjects of integration processes in education



1. Introduction

The processes of globalization and regionalization are interrelated scientific problems with many contemporary interpretations. Format corporate governance integration is seen as the management of a special institutional system, formed as a result of specialization, cooperation and diversification of business entities, presented in the form of corporate structures. And access to new levels of development of interaction participants requires a flexible response to market requirements (Mokronosov, Vershinin, 2014). This involves the mobilization of members of integration, the development of philosophy of corporate conduct, based on respect for corporate ethics, reputation and knowledge.

2. Problem Statement

International experience in management of innovation and technological development of the regions shows that today, a synthesis of scientific, industrial, economic and social policy is an objective process at different levels in the form of specific entities, called innovation clusters, with the aim of creating and maintaining an environment, conducive to the creation and active use of innovations in specific industries (Balland, Belso-Martínez, Morrison, 2015). For example, in EU countries, the typical three-tier formation of innovation policy includes a regional, national, and supranational component. Thus, the regional component is increasingly becoming a structural nature rather than a redistributive one. The Federal government has a priority in the field of fundamental research, personnel training, including in the sphere of research and development. And regions are increasingly implementing the policy of diffusion of innovation (Commission of the European Communities, 2003).

According to some authors, the essence of integration is manifested through:

- establishing linkages between disparate elements of the system;
- deepening, strengthening interaction;
- increasing the number of connections and establishing new ones;
- the emergence of new integrative (holistic) properties, coordination of linkages, changes in the structure of the system (Ferligoj et al., 2015; Davydova, Dorozhkin, 2016).

General principles of integration in relation to the education system highlight:

- the principle of symbiosis, aimed at researching and strengthening linkages between education and science with the purpose of development of their interaction and formation of system integrity;
- the principle of reciprocity for the development of education and science, providing the feasibility of the changes in their structural-isomorphic components.
- the principle of relevance, allowing for the formation and development of integrative forms of interaction of social institutions of education and science by merging into a single entity which has consisted of diversified parts and elements earlier.

In Russia, one of the first essential categorical features of integration in the post-war domestic pedagogics begins with the research of I. D. Zverev, who noted that integration means combining multiple subjects into one, in which scientific concepts are common sense and teaching methods (Zverev, 1981).

The systematization of possible directions of development of integration processes in education includes:

- corporate performance through the efficient policy management and improvement of internal processes;

- process of obtaining a synergy by ensuring the specialization of educational processes. In cases of vertical integration, it improves the coordination in the use of low-cost highly specialized assets, in the cases of horizontal reduced transaction costs, resulting in economies of scale. The result of modernization, updating education programs is the innovative synergy;

- diversification or the choice of directions of development. There is a long-term decline in demand, for example, for specific educational services, the declining competitiveness of the participants of the interaction. As a result of the diversification, it is possible to concentrate on the production of new educational services, increasingly demanded by the market at a particular time;

- the growth of mobility management due to the increasing role of decentralized governance by delegating authority (Davydova, Dorozhkin, Fedorov, 2016).

The efficiency of cluster integration in education is proved theoretically and confirmed by numerous foreign and domestic examples. In the works of Borgatti & Foster (2003), Brass et al., (2004), Kinne, (2013), Kitts, (2014), Vos, (2014), Dmitrieva, (2015), Silkina & Vaganova, (2015). Matveev et al. (2016), it is convincingly shown that different forms of networking, including the cluster, enable the participants of integration processes in different countries to develop concerted action to share with Internet updated content, technology and performance.

3. Research Questions

The pedagogical cluster is a special form of interaction of educational institutions, based on respect for corporate ethics and harmonization of interests of economic entities in the sphere of education, which aims at the maximum full use of available resources and relationships. Such structure allows adapting internal processes of economic entities to regional conditions, the characteristics of the participants of the pedagogical cluster to external conditions and changes in the market environment. In addition, the cluster is useful to consider as an open communication platform, in which education, government, and academia can discuss problems of development of education in the region.

In this context, it becomes urgent to develop organizational-pedagogical bases of formation of the cluster integrated system of educational institutions at the regional level and the approaches to its development. It is expedient to form, depending on the stages of its life cycle with definition of criteria for the harmonization of interests, which will allow stabilizing the development of the business interaction.

4. Purpose of the Study

Based on the key ideas and the foundation to build a model of the teaching cluster, as well as on previously identified features and principles of the organization of network interaction (Davydova,

Fedorov, Dorozhkin, 2016; Davydova, Dorozhkin, 2016), the methodology of the teaching cluster in the regional educational space will be presented, which includes the following steps.

At the first stage, a cluster is formed in an integrated system. The institution is a “core cluster integrated system” which performs the functions of a coordinator of the network of interaction, and at the same time acts as a scientific and educational platform for interoperability participants. At the same time, by delegating representatives of all subjects of interaction, the Coordinating Council of the pedagogical cluster is formed, which aims at quick solution of problems and contradictions during the interaction, at ensuring the stable functioning and development of the system of subjects interaction. During this period, it is particularly important to ensure access to information of participants in the online mode. Under the coordination of actions in favor of the formation of common goals, an integrated system is created. Timely information is of great importance for the University coordinator, the Coordinating Council, and for the subjects of interaction. The activities of the Coordinating Council of the pedagogical cluster are specifically regulated by agreements between participants of cluster integration. The main functions of the coordinating Council include:

- participation in the implementation of investment, innovative, and educational policy in the pedagogical cluster.
- participation in the preparation of cooperation agreements with constituent entities of the network interaction;
- promoting the development of mutually beneficial cooperation with organizations in other regions;
- creation of normative legal base regulating the development of the integration of cooperating structures in the format of the pedagogical cluster.

At the time of formation of the pedagogical cluster, educational organizations, belonging to the cluster, still do not have sufficiently stable connections and are not competitive. In this regard, in this period, special attention of the Coordinating Council is aimed at identifying breakthrough points of interaction. At this stage, the development of every entity in the network interaction is provided in the context of an operating strategy. Since integration in this period is based on the operating aspects, the efficiency of corporate structures will be reflected primarily in the growth of quality of educational services and the reduction of costs. Implementing areas for joint development at the stage of “becoming” a teacher of the cluster, the networking subjects move to the stage of “development” to build strong integrated linkages in a wider format, including the pricing in the sphere of rendering educational services, management of human resources across the cluster, a coordinated investment policy, etc.

It is assumed that at the stage of “development” entities already have enough money and connections to expand their share in the market of educational services based on mutually beneficial cooperation. Since the format of the teaching cluster provides for the participation of business actors not only from education. It is important to establish a mechanism of coordination of interests of all participants in the interaction. The role of the Coordinating Council during this period is to harmonize the interests of all subjects of interaction, to coordinate development, to participate in the development and implementation of investment and innovative policy of subjects of interaction, which creates additional opportunities for strengthening competitive positions of educational institutions. Once the growth points and the main relationship are identified, the subjects of interaction already have a strong position and are

able to develop independently. During this period, the participants of the interaction are moving to a stage of “maturity” in the context of the business strategy to develop economic relations within the pedagogical cluster. At this stage, the results achieved in the format of integration are oriented to the subjects of interaction for further “self-organizing” development. One of the most important steps in optimization of activity of subjects of pedagogical format of the cluster in this period is the improvement of the model of coordination of interests of integration subjects that are beginning to see themselves as full partners.

It should be noted that the initial stages of formation and development of cluster interaction of subjects are more controlled as the sustainable harmonization of the participants' interaction in this period is not observed, and there is a need for interaction, while the stage of self-organization ensures the stability of the interaction, based on mutually beneficial cooperation.

It is revealed that the development of specific educational institutions-participants of the interaction in the framework of the educational cluster is based on the following algorithm:

- definition of the mission of the entity in the integration process;
- assessment of the current status of the educational institution;
- study and assessment of the external environment of the business entity;
- management analysis of the strengths and weaknesses of the educational organization;
- analysis of strategic alternatives;
- selection and implementation of appropriate development strategies;
- monitoring of the results of implementing the chosen development strategy.

5. Research Methods

A systematic approach is needed to study the cluster integration of the educational organizations of interaction as a whole, consisting of interrelated, structured and complex elements. The main emphasis is on the identification of diverse connections and relationships, taking place inside the test object, and on its relations with the external environment. One should take into account the fact that the properties of the object as a whole system are determined not so much by summing the properties of its individual elements as properties of its structure, a special strategic, integrative relationships of the object. The cluster approach provides a combination of diversification, functional coherence and legal independence of constituent entities of the interaction and interest of regions in the formation of such integrated systems. It also provides various types of assistance in organizing and stimulating the development of cluster members on the part of state authorities and other institutions: educational, financial, municipal.

The following methodological principles constituted the basis for the selection of design research methods: objective, scientific, accounting continuous development and the dynamism of processes and phenomena, the unity of the description, explanation and prediction, and several others.

The experimental base of the research was Ural State Pedagogical University, more than 30 educational organizations, 10 organizations of professional education.

5.1. The stages of the research

The process of studying the possibilities of building the teaching cluster provides a sequence of actions including the conceptualization, programming of the process of development planning activities.

The study was conducted in three stages:

-at the first stage, existing methodological approaches in the philosophical, psychological and pedagogical scientific literature were theoretically analysed; the thesis on the subject highlighted the problem, purpose, and methods of research, the plan of the pilot study;

-at the second stage, the organizational and pedagogical model of the cluster's integrated system of educational institutions was realised;

-at the third stage of the analysis, findings were examined and clarified in the course of experimental work, generalization and systematization of the obtained results.

6. Findings

The strategy of a long-term socio-economic development of a country implies an increase of its competitiveness, an improvement of the quality of human capital and labor productivity trends, and a conversion of innovative factors into the main source of economic growth. Solving these problems requires a system of clear interaction between the government, businesses, and science and education using effective tools of innovation development, among which an important role is played by the cluster approach, based on the interpenetration and the intersection of economic interests and technological features of business entities. Let us emphasize that the cluster approach today is primarily regarded as a new management technology that allows improving the competitiveness of both a particular region or industry and the state as a whole. Moreover, it should be noted that the level of competitiveness of entities, combined into a cluster interaction format, is higher than that of local entities. This is due to the accumulation of resources and the reduction of costs, the establishment of stable interactions positions, active involvement of the infrastructure (services, consulting, supply and marketing channels that allow extending the range of positioning and full disposal of the existing potential of cooperation entities). And, finally, the development is accelerated and innovative products are introduced by providing state support of a developing cluster integration system. It is important that the economic entities integrated into a cluster have a common feature: an ability to co-educate and, therefore, to co-evolve. As a result of this integration, real and virtual systems, characterized by diverse competitive advantages, networking, and an ability to produce a synergistic effect, emerge (Gordon, McCann, 2000).

It is worth noting that the main concentration of educational resources in the knowledge economy is due to the increase of information flow circulation among the subjects of interaction. The complexity of the pedagogical cluster will be determined by the number of ties between these actors. That is, the primary functional purpose of the cluster is to create a set of conditions and mechanisms to enable self-organization and self-development of the subjects of cluster integration.

The interests of corporate structures, integrated in the pedagogical cluster, can be called a synergy because having an intangible nature (acquisition and preservation of reputation, the development of the cluster culture, corporate ethics, etc.), they facilitate a kind of synergistic "breakthrough" for participants of network interaction (Davydova, Dorozhkin, 2016). Harmonization of corporate interests in this format

by extending vertical, horizontal and diagonal interactions allows obtaining new result in the form of a synergistic effect, caused by the increased performance as the result of mutually beneficial cooperation of business entities.

According to some authors, the main directions of the work of the teaching cluster should be aimed at continuous mutual training of students, bachelors, undergraduates and graduate students in the resource bases of the participants of the education cluster. Joint meetings of departments, devoted to development of professional education in the region, should be organised. In addition, there must be development of a combined curriculum, participation in the independent evaluation of education quality, organization of work of analytical groups, an increase of the quality of career guidance activities on the clustered territories (Gnatyshina, 2011; Davydova, Dorozhkin, 2016).

The types and forms of career guidance activities of the participants are quite diverse. There is participation in teachers' meetings and the methodical commissions of educational institutions, meetings of heads of educational institutions of different levels; presentations at meetings of the staff and parent meetings in educational institutions. They also include meetings with alumni, round tables, presentations of exclusive programs on the activities of the participants of the education cluster, the organization of communication students. Besides, it is necessary to organise field elective courses for representatives of educational organizations – participants of the teaching cluster to disclose the specifics and benefits of the teaching work. The work should also involve engaging students in Olympiads, in competitions of pedagogical skills, in the work of the youth scientific societies, in the organizations, where the students are able to participate in the cluster, educational, scientific, innovative and other activities.

7. Conclusion

Based on the foregoing information, it should be noted that today the success of pedagogical formation of clusters in the regions is largely determined by the acceleration of information exchange and networking, the facilitation of access to educational technologies, improving the efficiency of processes of transfer of knowledge, using intellectual, material and information resources in training teachers and conducting research activities.

In general, the formation of an educational cluster comprises the following stages:

- the assessment of the possibility of formation of an educational cluster;
- the identification of participants interested in the development of cluster integration;
- the definition of the basic principles of cluster functioning, the strategic objective of the integration, and specific objectives of cluster interactors;
- the identification of interactions and interdependencies within an educational cluster;
- the development of regulations, rules, and standards that ensure the functioning of a cluster;
- the identification of the functional responsibilities of interactors;
- the selection of creative teams in educational institutions of a cluster for the implementation of specific innovative educational activities;
- the formation of a cluster management structure and a functioning mechanism: in the form of the Coordination Council, whose main function is the strategic planning and the adjustment of the

activities of the relevant structures, depending on the results and the degree of cluster adaptation to economic conditions.

A subsequent development of the integrated structures of an educational cluster involves the expansion of the local network interactions within the cluster through:

- the development of infrastructure by improving the level of service and creating interconnected technical means in accordance with the level of technical equipment of interactors;
- the development of information networks by improving the common information field for the entities of an educational cluster;
- the development of advisory networks, an increase of the qualification level of staff and profile training.

The main difficulties of the formation of an educational cluster today can be attributed to the problems of coordination of the activity of government and educational institutions in the field of cluster policies and to the limitation of a financial support toolkit for cluster projects in the field of education by regional authorities.

References

- Balland, P-A., Belso-Martínez, J. A. & Morrison, A. (2015). The dynamics of technical and business knowledge networks in industrial clusters: embeddedness, status or proximity? *Economic Geography*, 92, 35-60. doi: <http://dx.doi.org/10.1080/00130095.2015.1094370>.
- Borgatti, S., Foster, P. (2003). The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management*, 29(6), 991–1013.
- Brass, D. J., Galaskiewicz, J., Greve, H. R., Tsai, W. P. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of management journal*, 47 (6), 795-817.
- Commission of the European Communities (2003). Innovation Policy: updating the Union's approach in the context of the Lisbon strategy. Brussels, COM, 112
- Davydova, N.N. Dorozhkin, E.M. (2016). Management of a Network Interaction of Educational Organisations Oriented to Innovation Development. *Indian Journal of Science and Technology*, 9(29).doi:10.17485/ijst/2016/v9i29/88729
- Davydova, N.N., Dorozhkin, E.M., Fedorov, V.A. (2016). Innovative process development in the framework of scientific educational network: Management model. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universitetu*, 5, 157–163.
- Dmitrieva, E.A. (2015). Concerning the networking interaction experience of teachers and students of pedagogical university. *The Education and science journal*, 6, 77-88. DOI:10.17853/1994-5639-2015-6-77-88.
- Ferligoj, A., Kronegger, L., Mali, F., Snijders, T. A.B. & Doreian, P. (2015). Scientific collaboration dynamics in a national scientific system. *Scientometrics*, 104, 985-1012. doi: <http://dx.doi.org/10.1007/s11192-015-1585-7>
- Gnatyshina, E. A. (2011). Harmonization of training industry personnel and teachers of vocational training on the basis of cluster approach. *The Education and Science journal*, 10, 40 -50.
- Gordon, I.R., McCann, P. (2000). Industrial Clusters: complexes, agglomerations and/or Social Networks, *Urban Studies*, 37, 513-33.
- Kinne, B. J. (2013). Network Dynamics and the Evolution of International Cooperation. *The American Political Science Review*, 107, 766-785. DOI: <http://dx.doi.org/10.1017/S0003055413000440>
- Kitts, J.A. (2014). Beyond Networks in Structural Theories of Exchange: Promises from Computational Social Science. *Advances in Group Processes*, 31, 263-298.

- Matveev, Y.V., Trubetskaya, O.V., Lunin, I.A., Rousek, P., Kopnov, V.A. (2016). Clusters and their Role in Economic Development. *International Journal of Economic Perspective*, 10 (3), 113-125.
- Mokronosov, A.G. & Vershinin, A.A. (2014). Advanced development model of territorial human resources potential. *The Education and science journal*, 8, 19-32. doi:10.17853/1994-5639-2014-8-19-32
- Silkina, N.V. & Vaganova, N.J. (2015). Special features of the educational environment through the net interaction of education and production. *The Education and Science journal*, 6, 63-76. DOI:10.17853/1994-5639-2015-6-63-76.
- Vos, A. (2014). East European Qualifications Frameworks Lead Reforms in Education. *The Education and Science journal*, 6, 149-157, DOI: <http://dx.doi.org/10.17853/1994-5639-2014-6-149-16>
- Zverev, I. D. (1981). *Intersubject communications in the modern school*. M.: Pedagogy, 158