

A cluster approach in pedagogical education in the context of globalization

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Abstract

General globalization and rapid development of information and communication technologies, a need to introduce the cluster approach into the system of pedagogical education to improve the quality of training of future teachers in accordance with modern requirements for their professional competence require improvement as the content of training of future teachers for professional pedagogical activities in the context of international educational cluster and approaches to learning and organizing educational process.

The paper represents a model of future teacher training and a content of teaching innovative educational technologies. An implementation of them allows forming future teacher's competencies, the need of which is proclaimed by the processes of globalization in the modern world and ensures his/her professional readiness for the implementation of future professional and educational activities in the context of educational cluster.

The paper also describes features of teaching methods of future teacher for professional activities in the context of international educational cluster, which are reflected in involving him/her in continues activities related to organization and carrying out real international mega-lessons using capabilities of distance learning and cloud technologies. The given paper is prepared under support of grant of the Ministry of Education and Science of the Republic of Kazakhstan №AP05133502.

Keywords: *globalization of education, cloud technologies, educational cluster, competencies, principles of selecting the content, mega-class*

Introduction

High social and cultural significance of the pedagogical education for the sustainable development of society, the need to improve its quality, taking into account modern requirements, actualize the need for transition to a new model of pedagogical education. Such model integrates pedagogical higher education institutions (HEIs) with business-structures and school environment to enhance practice-oriented training of future teachers, and other pedagogical HEIs to study and introduction leading scientific and pedagogical experience.

Nowadays, school teachers also need for an efficient interaction with their colleagues. Therefore, distance communication, practice exchange through professional communities are becoming relevant, and considered to be key conditions for creation of innovative learning environment.

According to the said above, a cluster model of integrating pedagogical HEIs with each other, with business structures and with the school environment is considered to be the most promising. This model provides a close mutually beneficial cooperation between cluster participants and serves for solving some commonly significant problems encountered in the educational process, such as low level of learners' motivation to study, ineffective use of all capabilities of distance learning technologies, isolation from real practice, life and etc., and also it makes possible to implement professional training of future teachers and develop school teachers' professional skills (Sokolova, 2014; Melekesov & Erofeeva, 2014; Pak *et al.*, 2013).

Such educational clusters in pedagogical education provide a fundamentally new scientific and educational environment of practice-oriented professional training of future teachers and teaching schoolchildren without fundamentally breaking their established ways due to the advantages of modern cloud and other Internet services, electronic forms and teaching means.

At the present time, due to the development of Internet and distance learning technologies, it is possible to expand the scale of the educational cluster to the international level with the involvement of education institutions of different countries. It is very effective to cooperate not only in traditional spheres of activity, such as joint conferences, exchange of students and teaching staff, internships and etc., allowing to directly get acquainted with educational systems of other countries, exchange

scientific and pedagogical practices with foreign colleagues, but also in real everyday scientific and teaching activity, which contributes developing of professional communication skills, opportunities of gaining invaluable experience of cooperation in the international academic environment. It will provide new level of qualitative pedagogical education and speed up its integration into world educational environment.

A Mega-class technology is considered to be one of the most promising technologies within the cluster model of pedagogical education. The essence of this technology is to organize and carry out simultaneous mega-lessons for several schools of the cluster on topics of common interest for all, and with the involvement of scholars and specialists of various business structures in videoconferencing mode on the basis of cloud and distance learning technologies (Ivkina, *et al.*, 2014; Ivkina, 2017; Kamalova, *et al.*, 2016; Zhamilya, *et al.*, 2017).

The originality of the given technology is mixed-aged, «vertical», simultaneously three-level format of the learning process in special information environment with cloud and other Internet services, which provides carrying out simultaneous classes at school, classes on methodical training at university, and organizing of consulting activities of scholars and business representatives. At the same time, training of future teacher of the new generation is naturally integrated in a single learning process and his/her continuous professional development in the existing system of pedagogical education, continuous development of school teacher's skills in the process of his/her direct professional activity, motivated and successful learning of schoolchildren due to synergetic effects of collective interschool, mixed-aged and status learning in integrative learning, scientific and industry environment school-pedagogical HEI-business. At the present time, it is possible due to the development of Internet and distance learning technologies.

Combination of pedagogical HEIs with each other, business structures and schools based on «Mega-class» platform will not only establish close relationships and partnerships between education institutions of different countries, but also provide an opportunity to involve students in continuous professional and educational activities in international cluster environment. It will help future teachers to quickly adapt to pedagogical activity in the context of globalization and general informatization, its features and modern requirements set by the school for their professional qualities.

In order to successfully implement professional and pedagogical activities in the context of international educational clusters a future teacher should have a number of additional competencies, which are required due to the processes of informatization and globalization of education, the expansion of international cooperation, the establishment and development of effective partnerships with world leading educational and scientific institutions, the participation in international projects and programs, the development of academic mobility. These competencies are the followings:

- a knowledge of age and psychological characteristics of communication in virtual environment, owning communication means in Internet, ability to implement professional communication, including communication with foreign colleagues;
- an ability to organize team work in a network, joint professional activity, cooperation in organizing network learning;
- a readiness to use innovative pedagogical (virtual discussions, webinars, role and business games, round table, network projects, case study and etc.), information and communication (social networks, cloud and other Internet services) and distance learning technologies.

Their effective formation involves significant changes in the content of teacher training for professional activities in the context of international educational cluster, enhancing his/her professional, practice-oriented orientation, finding appropriate approaches to learning.

However, despite the constant interest of scientists to the problem of training of future teacher for professional and pedagogical activities in the context of globalization of education (Kamalova & Kisseleva, 2018; Makarova, 2014; Akkasynova, 2016; Haludorova, 2013; Arakelov, *et al.*, 2016; Gluzman, 2018; Gercog & Gnatyshina, 2008), a significant amount of studies in the field of training of pedagogical staff within educational cluster (Akkasynova, 2018; Bidaybekov, *et al.*, 2015; Zalyalova, 2010; Karbanovich, 2014; Davydova, *et al.*, 2014), issues of defining the content of training of future teachers for professional and pedagogical activities in the context of international cluster model of education have not been a subject of separate study yet. It allows identifying a relevance of considered theme.

Structure and content of training

In the context of international educational cluster a teacher, regardless of the subject profile, should have a certain set of knowledge, abilities and skills. And, a teacher's methodical training is considered to be important in the system of his/her professional training. The efficiency of teacher's methodical training, of course, is connected with the level of his/her theoretical training. Future teachers must deeply know the original and main concepts, facts and methods of subject area that they will teach at school. This will provide them with effective knowledge within the limits far beyond the school curriculum. That is why all disciplines of subject training of future teacher should reflect the latest achievements in the field of computer technologies, and should be adjusted in accordance with modern content of school education. A link with school course should be leading idea of each course of special cycle of educational program of teacher training.

The subject training of future teacher should be carried out as an integrated professionally-oriented system. And, if teachers of special disciplines prefer teaching methods that will be used by students in their further pedagogical activities it will contribute their more successful methodical training.

The teaching methods course should perform a function of system-forming course in the professional development of the future teacher. In this course, the knowledge of disciplines of subject training of all cycles (general educational (general cultural), basic and major) should be integrated into single system. This course is responsible for introduction general theories of education, training and upbringing into the practice of teacher's work in accordance with requirements of the social client. At the same time, method of teaching course itself should be a model for other disciplines: to be competently constructed, functional and have well-established methodical system that ensures the introduction of pedagogical, psychological and methodical ideas into the educational process in their integrated interrelation.

It is possible to organize one-time classes with students and schoolchildren of the cluster, and with participation of HEI teachers and school teachers within the framework of methodical training of future teacher. If student's methodical training is connected with designing and carrying out real lessons with participation of teachers, scholars and HEI teachers, and business representatives, not only the practice-oriented, professional nature of the training will be provided, but also the motivation and responsible attitude of the future teacher towards it (Pak & Sokolskaya, 2017).

Elective courses on modern pedagogical and information and communication technologies play a significant role in the system of training of teacher for the professional and pedagogical activities in the context of cluster approach. Future teachers, of course, should have appropriate training in the field of modern cloud and distance learning technologies: possess the basics of the necessary knowledge and accumulate personal experience of their practical use in their professional and pedagogical activities; know the possibilities of their use to improve the efficiency of the educational process and be ready to apply them in the process of teaching schoolchildren in the educational cluster. Learning them by future teachers gives good possibilities for forming their necessary competencies for successful professional activities in the context of educational cluster.

The improvement of a quality of training of teacher, formation of future teacher's ability to implement professional communication in educational cluster, including communication with foreign colleagues, is promoted by the mandatory inclusion of system of courses of language training into the program of teachers training in the Republic of Kazakhstan, according to new language policy of the government, which is aimed at mastery Kazakh, Russian and English.

More effective formation of the listed above competencies, necessary for successful implementation of professional activities in the context of cluster model of education is possible when «Innovative learning technologies and professional foreign language» integrated elective course is included in the system of training of future teachers. The relevance of it is determined by fundamentally new training requirements for teachers' training in the context of globalization of education.

The aim of the discipline is to develop abilities and readiness of future teachers to use in their professional and pedagogical activities cloud and other Internet services based on distance and mixed forms of education; to develop abilities to implement professional communication in foreign language.

Its content is determined in accordance with uniform for European educational environment principles for formation and development of the content of pedagogical education as following:

- fundamentality – an inclusion of elements significantly reflecting professional and pedagogical culture into the content;
- context – a focus on functional support of the future activities;
- relevance – a timelessness of the learning the given content, focus on the decision of current pedagogical issues;
- verifiability – an evaluation of the content for its high scientific and practical significance;
- differentiation – a determination of volume and depth of training of teachers, taking into account its levels;
- humanization – taking into account students' needs, expansion of their free choice, support of creative beginnings of the individual.

The considered content contains the following matters related to the organization of study in the context of international educational cluster:

- A concept of educational cluster. A history of the development of clusters in education system.
- Educational clusters as innovative model of globalization of learning process in the context of informatization and mass communication.
- Cluster model of education in pedagogical education. A need to create international educational cluster.
- Mega-lesson as innovative form of education in educational cluster.
- Means of organizing interaction in the educational cluster. Video conferencing system.
- Network etiquette: norms and rules of communication in a network.
- Internet services for organization collaboration. Network communication implementation. Planning and organizing of training activities.
- Cloud technologies as means of organization of joint network activities.
- Organization and carrying out international training network project.
- Fundamentals of the formation of mastering the subject-language material.
- Characteristics of the content of subject area in the specialty in foreign language.
- Specific professionally-oriented material and its usage in the given professional cases.

The teaching the given topics will contribute to the conscious inclusion of future teachers in the work of the international educational cluster, while still being students of pedagogical HEI, and later on to implement professional pedagogical activities in such cluster. The training will be more efficient if it is implemented on the base of integration of competence, student-centered and context approaches. These approaches will provide more quality of teacher training, and contribute for development of their professional competence for success professional and pedagogical activities in the context of globalization of education.

The proposed model of professional training of teacher is given in the table 1.

Table 1 – Model of professional training of teacher in the context of international educational cluster:

The content of educational process	Scientific approaches to learning and organizing educational process	Educational outcomes	The role and functions of educational process participants
General education modules: - Social and economical module; - Language training module: • Kazakh/Russian language	Competence and context, student-centered approaches	- a knowledge of age and psychological characteristics of communication in virtual environment, owning communication means in Internet, ability to implement	Student - searches, selects, analyzes, organizes and presents information Teacher

<ul style="list-style-type: none"> • Professional Kazakh (Russian) language • Foreign language • Professionally-oriented foreign language <p>Professional modules:</p> <ul style="list-style-type: none"> - Psychological and pedagogical module; -Natural and mathematical module: <ul style="list-style-type: none"> • Information and communication technologies (in English) <p>Special modules:</p> <ul style="list-style-type: none"> - Fundamental basis if subject training; - Methods and technologies of teaching: <ul style="list-style-type: none"> • Teaching methods; • Innovative technologies of teaching and professional foreign language 		<p>professional communication, including communication with foreign colleagues;</p> <ul style="list-style-type: none"> - an ability to organize learners' team work in a network, joint professional activity, cooperation in organizing network learning; - a readiness to use innovative pedagogical (virtual discussions, webinars, role and business games, round table, network projects, case study and etc.), information and communication (social networks, cloud and other Internet services) and distance learning technologies. 	<ul style="list-style-type: none"> - organizes student's activity in innovative educational environment <p>Scholars, business, industry, social sphere representatives</p> <ul style="list-style-type: none"> - consult
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Organization of teacher training for professional activities in the context of international educational cluster

The above mentioned competencies are formed in the process of training of future teachers in the real educational cluster with use of cloud and distance learning technologies when they do tasks, mainly represented in the form of cases and projects. Let's consider some of these cases and projects:

1. Tasks for forming of readiness of future teachers for professional communication

Case 1. Organization of mega-lessons in the context of educational cluster

Description of the situation

Nowadays due to the development of Internet teachers have opportunity to exchange experiences, communicate with domestic, at the same time with foreign colleagues on exciting professional topics. Such activities are possible to implement not only during scientific and methodical conferences, round tables, but also directly in the process of preparation for the learning process in the context of educational cluster.

It is expected to carry out a number of mega-lessons with school teachers and teachers of pedagogical HEI of both domestic country and foreign ones in the context of educational cluster. It is required to get to know each other, discuss scenarios of mega-lessons before carrying out them, and etc. All of this can be implemented on a specially-organized webinars (online seminars) in the real time. A moderator is required to conduct webinars. The role of moderator can be played by one of the HEI representatives. Taking into account that all members of the educational cluster are from different places (cities, countries), how to organize the seminar efficiently and productively?

Questions and tasks

1. Prepare brief introductory information about planned mega-lessons in the context of educational cluster.

2. Define questions to be discussed at the webinar.
3. Review platforms for webinars, and select appropriate one for further work. Write instruction guide how to connect remote participants.
4. Offer participants cloud storage for joint work. Create a table «Contact details of participants», and send everyone link to it, so all participants could enter their contact details.
5. Discuss topics of mega-lessons with all participants. Carefully consider how to organize this part, so as not to spend a lot of time on it.

Comments

It is an individual case. It is required to answer questions and do tasks.

Case 2. Networking etiquette in the virtual world

Description of the situation

At the present time learners spend a lot of their time on the Internet. Use it for various purposes: study, communication, entertainment, share documents, e-shopping and etc. On average, 60% of Internet services are intended for communication.

For example, let's consider communication in social networking or via e-mail, which have become an integral part of each learner's life. Communication in social networking or via e-mail also requires following some set of etiquette rules as in ordinary communication. But, a few people know, or even if they know follow these rules in the virtual life. At the same time, when learners know and follow network etiquette or just netiquette they effectively use social networking services, communicate with people in a simple, quick, productive and pleasant way. People can't imagine their life without the Internet, and use it more and more. That is why it is worth thinking about the rules of right communication in network interaction.

Despite the fact that the netiquette is considered to be an integral part of modern society we see that most of the learners do not follow network norms and rules, and do not take them seriously.

Questions and tasks

1. What is network etiquette, and what are the rules of network etiquette?
2. What rules should we follow when communicating in social networking and via e-mail?
3. Conduct a survey among learners to find out whether they know and follow network etiquette.
4. What is the reason for not following the network etiquette?
5. How to explain the learners the importance of following network etiquette?
6. What are the causes of not knowing and not following the rules of netiquette?
7. What do you suggest to solve the given situation?

Comments

It is an individual case. It is required to answer questions and do tasks. At first it is required to compose questions (minimum amount of questions is 5), think about the method of conducting the survey (online or paper), make conclusion according to its results. Think of the way how to explain learners the importance of following netiquette and what effects may arise in case of not knowing or not following these rules. As a result of answering questions and doing tasks, offer one or several versions of solving this issue.

Project 1. Network interaction of educational cluster members

Aim: development of a model of organization of network interaction and discussion it with the educational cluster members

Planned result: model of network interaction of the educational cluster members

Project 2. Fundamental principles of network etiquette

Aim: acquaintance with basic rules of netiquette

Planned result: infographics on «10 basic principles of netiquette»

2. Tasks for formation of readiness to use social networking, and cloud and other Internet services in future professional activities

Case 1. Social networking as a mean for interaction of participants of educational process

Description of the situation

It is known that project requires a lot of time and effort to get a desired result. Usually learners deal with projects in out of time. In such cases in order to organize remote interaction of learners with teachers and project members it is convenient to use Internet services, including social networking. Nowadays almost every learner is registered in social networks and spends a lot of time

communicating with friends, reading news, posting photos, watching video, sharing news with others, listening and downloading music, playing games and other things. Therefore, social networks are considered to be one of the convenient platforms for organization of learners' interaction, which is necessary condition for dealing with group learning projects.

In modern conditions the usage of social networking in the educational process allows organizing constant consult and information support of its all participants. It provides opportunities for learners to directly contact teacher with questions and comments during the execution of the project, and for teacher to control their work, timely help, consult, coordinate in case of need and etc. All of this is implemented due to various forms of communication (surveys, voting, messages, including voice messages and etc.), which are offered by social networking.

Social networking offers communities and groups to effectively organize joint works. One can join these communities and groups, also can create their own ones. They are created on the base of common interests, preferences for organization of mutually beneficial cooperation.

Despite the listed advantages of social networking there are also disadvantages of using this service. It is one of the reasons why parents restrict children's access to social networking, and sometimes even forbid them from visiting them. Parents fear that social networking can cause of forming children's virtual addiction, and they will less and less communicate and spend time with their relatives and friends in reality, their children will withdrawn, aggressive, indifferent to everything around them, etc. The situation is such that social networking was chosen as a platform for organizing remote interaction of learners with teacher and project group members. Taking into account parents' attitude to social networking, how to get out of this situation?

Questions and tasks

1. What are social network services and what types are existed?
2. Study history of appearance and development of social networking.
3. Conduct a survey among learners for usage of social networking.
4. According to the result of the survey, determine the most popular social networking used by the majority of learners. Determine what caused their choice.
5. Offer several versions of implementing remote interaction of learners with teacher and project group members with help of one of social networking.
6. Think of several ways to convince parents of learners in the use of social networking for educational purposes.

Comments

It is an individual case. It is required to answer questions and do tasks.

Case 2. Cloud technologies in education

Description of the situation

Information and communication technologies due to their rapid development are widely used in the educational process. The usage of ICT helps to increase learners' motivation, effectively organize their learning and cognitive activities during the learning process, interactivity and visibility contribute to better presentation, understanding, and mastering the learning material.

Cloud technologies are considered to be one of the most promise directions of the development of modern information technologies. Here, cloud technologies are technologies of distributed data processing, in which computer resources serve to users as internet services. Cloud technologies are used in various areas, including education. They have the following didactic possibilities, which confirm usefulness of their use in the educational process:

- joint use and publication of documents of various types;
- organization of learners' joint work both at the class and out of class;
- organization of classes with help of various interactive services;
- remote interaction of learners with teacher and with each other using real-time communication forms;
- organization of various forms of control and assessment of learning outcomes and etc.

Of course, one of the important didactic benefits of using cloud technologies in the educational process is organization of teachers and learners' joint work.

Despite the all listed benefits of cloud technologies, in real life, they are not a big popular among school teachers, including oddly enough, informatics teachers. What is the reason of it and how to solve this issue?

Questions and tasks

1. What is a cloud technology, and what are the benefits of cloud services?
2. Study history of appearance and development of cloud technologies.
3. Review existing cloud storages, and select appropriate one for using in the educational process. Justify your choice.
4. Give several examples of using cloud technologies when teaching your subject at school.
5. List all possible reasons of appearing the described situation.
6. Offer several versions of solving this issue.

Comments

It is an individual case. It is required to answer questions and do tasks. Students have to review popular cloud storages (minimum amount – 3), describe their pros and cons. On the base of the review, select one cloud storage, convenient for use in the learning process, and justify your decision. Give examples of applying capabilities of the selected cloud storage when teaching informatics. It is necessary to list all possible reasons of the described situation and offer ways of solving this issue.

Project 1. Virtual platform for team work

Aim: to define a virtual environment for organization of team work, study its capabilities. Studying capabilities of RealtimeBoard virtual whiteboard.

Planned result: description of the virtual platform for organization of team work, development of instruction guide about how to deal with RealtimeBoard.

3. Tasks for formation of abilities to engage learners into collective activities, accompanied by the implementation of joint network learning projects

Case 1. Joint network project activity

Description of the situation

A learning project is learners-partners' joint learning and cognitive, creative or gaming activity, which has a common goal and agreed ways to achieve a common result in solving an issue relevant to all project group members.

For schoolchildren, it is the opportunity to unleash their creative potential, to apply theoretical knowledge in practice, to include themselves in an independent or, in most cases, group learning and cognitive, practice-oriented activities to solve a particular issue, the embodiment of which is the final product.

When learners work with group project, they learn to work in a team. At the same time, such activities form and develop the learners' cooperation skills, ability to show flexibility, to see the point of view of another, to compromise for the sake of a common goal. And, the process of passing through all the stages of the project work contributes to their group unity.

The rapid development and widespread use of the Internet contributes to the involvement of learners in joint network project activities. Nowadays, there are a lot of platforms, intended to conducting such activities.

There is a group of learners of 5 people, collected together to execute a project work. The project lasts two weeks, and it is executed in out of class time. How to effectively organize learners' joint network project activities in such conditions?

Questions and tasks

1. What project topic would you offer learners?
2. How would you distribute the work among project group members?
3. What environment would you use for the development of project product?
4. Describe the project stages on your selected topic.

Comments

It is an individual case. It is required to answer questions and do tasks. One needs to choose a project topic, which is of interest and suitable for conducting group network activities, set a goal, define objectives and assume the final product of the project. Specify the criteria by which the project leader will be selected, assign tasks to the team members. Select the environment in which the project

product will be developed by joint efforts of project group members. Describe the project stages on selected topic.

Case 2. Virtual competitions of project works

Description of the situation

A competition is an activity organized to identify the best among presented works by participants. The participation in competitions is a good chance to learn something new, to look at something known from the other side, to demonstrate your knowledge and erudition. Nowadays, a lot of competitions are held every year, and a huge amount of people take part in them.

It is a traditional event to hold various competitions among schoolchildren in education institutions, including at schools. The goal of school competitions is to increase schoolchildren's motivation to the learning process, to determine and develop the learners' learning and cognitive, research abilities, their creative potential, to fully disclose their abilities and talent.

At the present time, due to the rapid development and accessibility of the Internet, the number of online competitions has significantly increased. Schoolchildren of different countries can take part in such competitions. The virtual competitions can become ideal platform for representation of project works. How to organize such competition – a platform, which is accessible for all participants?

Questions and tasks

1. What online whiteboards for organization of joint work in a form of virtual competitions are existed?
2. Select online whiteboard for the development of a stand of the virtual competition, study its capabilities.
3. Determine a structure of the project work stand.
4. What additional information should be presented on the stand except project work products?
5. Give an example of the virtual competition stand, developed on an online whiteboard.

Comments

It is an individual case. It is required to answer questions and do tasks. You have to review online whiteboards, appropriate for the development of the project works' virtual competition's stand. Determine a structure of the stand, divide it into thematic sections, and decorate. Present the stand, and link to it.

Project 1. International network project of schoolchildren

Aim: to study features of network projects, acquire skills of their organization at school.

Planned result: the development of a scenario of network project for schoolchildren.

The above-described educational tasks in the form of cases and projects are considered as part of the Innovative learning technologies course. All tasks and assessment criteria are placed in the cloud and they are available for all members of the educational cluster. Dealing with such learning tasks helps to form future teachers' listed above competencies, necessary for implementation of professional and pedagogical activities in the context of international educational cluster.

Students demonstrate the level of competencies at practical classes on teaching methods and directly during pedagogical practice, which are integral part of professional training of future teachers, where they organize and carry out real mega-lessons.

In the educational cluster, starting from junior courses, students are involved in their future pedagogical activities. Students can not only attend schools classes and other events in a role of passive observers and listeners, but also they have an opportunity to be engaged in real educational activities of school, starting from the role of tutor and finishing with the role of expert and moderator. Also, they can take active part both in designing and creating scenarios of mega-lessons and directly in the educational process itself, solve pedagogical situations arising in the educational process, make decisions, provide online and consultative and substantive support to students' activities using Internet services for communication. Such continuous involvement in future professional and pedagogical activities, the study, synthesis and accumulation of advanced experience will allow future teachers to quickly adapt to the teaching activities, its features and requirements.

These offered approaches to the organization of education have been tested in the training of informatics teachers in the Republic of Kazakhstan and Russian Federation within the framework of unique international network project «Megaclass: international educational cluster», integrating a number of Kazakhstan and Russian schools, Krasnoyarsk state pedagogical university named after

V.P. Astafiev, Abai Kazakh National Pedagogical University, which radically has changed the classical educational worldview. It is offered introduction them into the system of training of all teachers.

References

1. Akkasynova, Zh.K. (2016). K voprosu podgotovki budushchego uchitelya informatiki k professional'noj deyatel'nosti v usloviyah globalizacii uchebnogo processa [To the issue of training of future informatics teacher for professional activities in the context of the globalization of learning process]. I International Scientific conference in the framework of the IV International scientific and educational forum «Human, family and society: history and perspectives of development» (pp. 158-162). Krasnoyarsk: Siberian Federal University.
2. Akkasynova, Zh.K. (2018). Professional'naya podgotovka budushchego uchitelya informatiki v usloviyah mezhdunarodnogo obrazovatel'nogo klastera [Professional training of future informatics teacher in the context of international educational cluster]. Bulletin of Abai KazNPU, 2(62), 72-75.
3. Arakelov, A.V., Arakelova, Yu.A., & Alieva, M.F. (2016). Podgotovka sovremennogo uchitelya v usloviyah realizacii nepedagogicheskikh napravlenij podgotovki bakalavra v klassicheskom vuze [Training of a modern teacher in the context of the implementation of non-pedagogical areas of bachelor's studies in a classical university]. Bulletin of Orenburg State University, 4(192), 3-10.
4. Bidaybekov, Ye.Y., Kamalova, G.B., Pak, N.I., & Akkasynova, Zh.K. (2015). Sovershenstvovanie professional'noj podgotovki budushchego uchitelya informatiki na osnove klasternoj modeli obucheniya [Development of professional training of future informatics teacher on the base of cluster model of education]. Bulletin of Abai KazNPU, 2(50), 205-211.
5. Davydova, N.N., Igoshev, M.B., Simonova, A.A., & Fomenko S.L. (2014). Obrazovatel'nyj klaster kak sistemoobrazuyushchij komponent regional'noj modeli nepreryvnogo pedagogicheskogo obrazovaniya [Educational cluster as a backbone component of the regional model of continuing pedagogical education]. Pedagogicheskoe obrazovanie v Rossii, 10, 72-77.
6. Gercog, G.A., Gnatyshina, E.A. (2008). Osobennosti podgotovki professional'no-pedagogicheskikh kadrov na sovremennom ehtape obshchestvennogo razvitiya [Features of the training of professional and pedagogical personnel at the present stage of social development]. Vestnik Uchebno-metodicheskogo ob"edineniya po professional'no-pedagogicheskomu obrazovaniyu, 1(42), 41-53.
7. Gluzman, A.V. (2018). Transformaciya pedagogicheskogo obrazovaniya v sovremennom mire [Transformation of teacher education in the modern world]. Gumanitarnye nauki, 1, 8-10.
8. Haludorova, L.E. (2013). O nepreryvnom obrazovanii pedagoga v usloviyah globalizacii [About continuous education of teacher in the context of globalization]. Filosofiya obrazovaniya, 1(46), 32-36.
9. Ivkina, I.M., Kulakova, I.A., Pak N.I., Romanov, D.V., Simonova, A.L., Sokolskaya, M.A., Khegay, L.B., & Yakovleva, T.A. (2014). Megaklass kak innovacionnaya model obucheniya informatike s ispolzovaniem DOT i SPO [Mega-class as innovative model of teaching computer science with using of DET and FS] (Collective monograph). Krasnoyarsk, Russia: Krasnoyarsk state pedagogical university named after V.P. Astafiev.
10. Ivkina, L.M. (2017). Formirovanie metodicheskoy gotovnosti budushchih uchitelej informatiki v usloviyah obrazovatel'noj platformy «Mega-klass» [Formation of methodical readiness of future informatics teachers in «Mega-class» educational platform] (Candidate dissertation). Krasnoyarsk state pedagogical university named after V.P. Astafiev, Krasnoyarsk, Russia.
11. Kamalova, G.B., Akkasynova, Zh.K., & Makashev, K. (2016). Mega-urok kak innovacionnaya forma organizacii obucheniya informatike [Mega-lesson as an innovative form of organization of teaching informatics]. Pedagogika i psihologiya, 3(28), 106-111.
12. Kamalova, G.B., Kisseleva, Ye.A. (2018). K voprosu podgotovki pedagogov v usloviyah globalizacii [To the issue of training of teachers in the context of globalization]. Bulletin of Abai KazNPU, 3 (63), 364-370.

13. Karbanovich, O.V. (2014). Professional'no-obrazovatel'nyj klaster kak determinanta razvitiya professional'nyh cennostej budushchego uchitelya [Professional and educational cluster as a determinant of the development of professional values of the future teacher]. *Sovremennye problemy nauki i obrazovaniya*, 6. Retrieved from <http://www.science-education.ru/ru/article/view?id=16641>
14. Makarova, O.B. (2014). Professional'naya podgotovka budushchih uchitelej v usloviyah globalizacii obrazovaniya [Professional training of future teachers in the context of globalization of education]. *Professional'noe obrazovanie v sovremennom mire*, 1(2), 89-94.
15. Melekesov, G.A, Erofeeva, N.E. (2014). Obrazovatel'nyj klaster podgotovki pedagogicheskikh kadrov [The educational cluster of training of teachers]. *Vestnik OGU*, 3(164), 84-88.
16. Pak, N.I., Simonova, A.L., Sokolskaya, M.A., Starchenko, D.A., Stepanova, T.A., Styugin, A.A., Styugina, A.A., Turanova, L.M., & Yakovleva, T.A. (2013). Sozdanie klasternoj sistemy social'no-obrazovatel'noj podderzhki shkol'nikov sel'skoj mestnosti i Krajnego Severa na distancionnoj platforme «shkola - vuz» [Creation of a cluster system of social and educational support for schoolchildren in rural areas and the Far North on the «school-HEI» distance platform] (Collective monograph). Krasnoyarsk, Russia: Krasnoyarsk state pedagogical university named after V.P. Astafiev.
17. Pak, N.I., Sokolskaya, M.A. (2017). Edinaya metodicheskaya sistema predmetnogo obucheniya shkol'nikov i studentov na baze tekhnologicheskoy platformy «Mega-klass» [Unified methodological system of subject teaching in the basis of technology platform «Mega-class»]. *Prepodavatel' XXI veka*, 1, 123-134.
18. Sokolova, E.I. (2014). Termin «Obrazovatel'nyj klaster» v ponyatijnom pole sovremennoj pedagogiki [A term «Educational cluster» in conceptual field of modern pedagogy]. *Nepreryvnoe obrazovanie: XXI vek*, 2(6), 153-160.
19. Zalyalova, A.G. (2010). Regional'naya model' podgotovki pedagogicheskikh kadrov v usloviyah obrazovatel'nogo klastera [Regional model of teachers training in the context of educational cluster](Candidate dissertation). Kazan, Russia.
20. Zhamilya, A., Nikolay, P., Liubov, I., Dmitry, R., & Liudmilla, K. (2017). Organization of teaching schoolchildren programming in the contex of international educational cluster. *Man In India*, Vol.97, Iss.21, 595-608.