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## **The Model of Cluster System of Social and Educational Support of Rural Area and the Extreme North School Students**

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*The article gives the grounds for innovative model of cluster system in future teachers' training at Pedagogical University, acting teachers' advanced training and social and educational support of rural area and the Extreme North school students on the school – higher educational institution distance platform.*

*Keywords: cluster model of educational process organization, Internet-project, distance education.*

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The dynamism of informational and communicational technologies (ICT) development always makes us review the use of the concept of distance educational technologies (DET) both at school and higher educational institution. The class-lesson system contradicts the necessity to learn and use new net technologies, electronic and DET not in training situations but in real practice.

A future teacher must be ready to educate school students under new informational conditions, be able to organize net and electronic education with the use of DET. Net infrastructure of education makes us do training open and integrative (Pushkareva, 2013; Pushkareva, 2009). Teaching of many subjects, first of all, computer science can't be conducted isolated, separately at school and a classroom by one teacher. Thereupon organization of education

and procedural content of subjects at schools and higher educational institutions have to be corporative, practically-oriented and research.

The goal of the work is the grounds for innovative model of cluster system in future teachers' training at Pedagogical University, acting teachers' advanced training and social and educational support of rural area and the Extreme North school students on the school – higher educational institution distance platform.

Conceptual bases of modern education under the conditions of global informatization and communication include some issues:

- 1) advance education on the basis of philosophy of education of the future (Pak, 2008);
- 2) equal educational conditions for all, including rural area school students,

children with limited abilities and so on, regardless of their place of living;

- 3) to go to school or higher educational institution not to study but create future at the expense of rise of inner motivation to get the education (Karlova, 2013).

At present there are different approaches and educational models allowing somehow realizing these issues with the use of DET (Andreev; Soldatkin, 2001). The most widespread is the net centrist-star in typology model of organization of distance education for school students by the forces of special higher educational institution departments and Centers of distance education (DE) (Fig. 1).

The creation of the portal of digital educational resources (DER) including distance resources, ways of control and administration of distance participants of educational process are covered in this model. The teachers and specialists who are able to fulfill education with the help of DET are drawn in the work.

Disadvantages of the model are schools do not cooperate with each other and Centers have to take upon all the necessary functions of educational process coordinating them with school direction and other involved structures, thus, doubling their activity on the distance basis.

Moreover, the model doesn't allow going beyond the frames of traditional process of

education, it only provides for better technical possibilities of face and without seeing communication of a student with a teacher.

Modern society makes strict demands and conditions to education:

- 1) education must be advanced, integrated with life and science;
- 2) education must be uninterrupted, combine in one educational process school students and university students – future teachers' training and advance education of teachers;
- 3) education must use effectively the potential of ICT and DET for educational services provision for learns regardless of time and place of their living;
- 4) education must involve the whole society into the process: manufacture, science, higher educational institutions and inhabitants;
- 5) education must be of low cost and without radical change of existing educational system.

The system of pedagogical education is a strict hierarchical structure of relatively independent different departments of educational organizations. With identical purposes, normative regulations, educational standards comparatively isolated educational process defined by material and technical base, psychological-pedagogical,

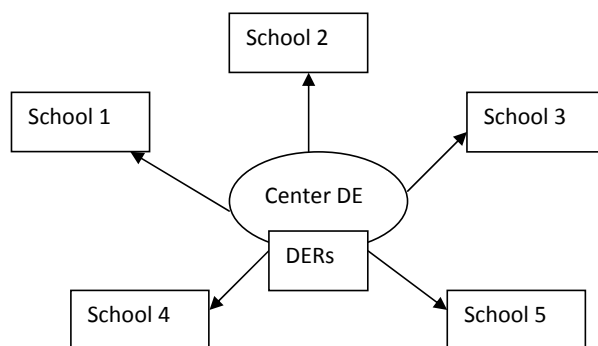


Fig. 1. Star typology of DE organization

methodical base and personnel staff is fulfilled in each school and pedagogical higher educational institution. The structure of educational institutions can be presented analogically with the system of computer first appearance and development before “the Internet period”. Then computers were not connected to the net, data exchange was with the help of physical media. Computer nets provided with extremely possibility of all resources integration developed distributed technologies of information procession. By analogy in the system of education educational cloud technologies should be mentioned that allow including united DERs for different kinds of educational and scientific activity according to the model showed on Fig. 2 into educational process. Appearance of supercomputer, cluster systems allowing parallel processing of information defined the formation of cluster approach in planning and development of industrial, economic and social sectors. It seems that cluster approach in pedagogical education will allow integrating schools and higher educational institutions into united mechanism in a substantial manner.

Let us review the model of educational process organization at schools of rural area and the Extreme North, pedagogical higher educational institution (HEI) with the involvement of other structures (Fig. 2).

This model has an open platform (the principle of “open architecture”); any participant (organization or a person) can be connected or disconnected to the system. Educational cluster supposes that some kinds of activity of all participants must represent a united process. For example, training of the students at the faculty of primary school must be connected with organization and conducting of mega-lessons at the schools of the cluster providing a real pedagogical practice for the future teacher. Schools with experienced teachers can act as moderators of the lesson and schools with the lack of staff need a tutor providing technical and organization support. School students on frosty days when they cannot attend school can connect to the lesson through their home PC and follow all the moderators, teachers and tutors’ instructions. In the future cluster, if there are good connection channels, the students can take upon an individual support of an individual school student. Involvement of professors, scientists, outstanding and successful specialists into the cluster activity will allow enriching of educational process and advancing the qualification of university and school teachers participating in the project. Even so a problem-oriented part of the lesson will allow making education advanced, integrated with science and life.

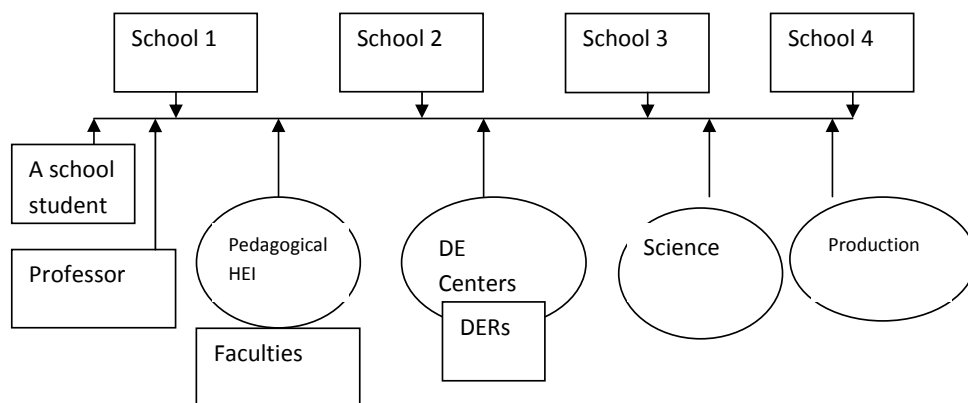


Fig. 2. Cluster model of DE organization

No doubt that in the cluster the model of mega-class defines the formation of educational and methodical complex aimed to realize united educational process in school students' training in the interschool cluster, training of students under the conditions of real educational practice and teachers' advance training during their professional activity at the basic lessons under the conditions of ICT and with the use of cloud DER.

The mega-lesson is conducted simultaneously at all the schools of the cluster with participating of university teachers and students who together with school teachers have prepared the lesson and conduct it in accordance with the concept of the net course. The net course is to contain projects and live tasks that are interesting for mutual distributed activity.

A cloud is the portals of educational means (mental, textbooks, video lectures and so on), quality of education diagnostics, school students' competences, students, school students and teachers' developments in actual problems of science and society (Boikov, 2011; D'iachuk et al, 2011; Zotin, 2012; Nigmatulina et al, 2011).

The lessons provide for time limit of net interaction of all the participants by the analogy with of international industrial corporations' activity (for example, automobile industry).

What must be done for realization of cluster model of education?

1. To develop the mechanism of educational activity organization with school students with the use of distance technologies. This mechanism have to provide with the administration of the system of distance support of basic educational program subjects, elective courses, educational and scientific work with school students, that will ensure effective use of staff potential of pedagogical workers, university professors, scientists

of academic institutions and industry workers to compensate the lack of staff at rural schools.

2. To ground scientifically and to realize the conditions for creation of rich cloud environment of educational-cognitive and educational activity with school students with the use of distance educational technologies.
3. To develop the technical specifications for creation of telecommunication environment of educational cluster and needed software for organization of video-conferences with distant students' computers.
4. To develop the portal of DER and automatize information system of school students, students and teachers' net educational activity administration accordingly to educational process at schools and higher educational institutions.

It is impossible to solve the tasks mentioned above at once and alone. It is necessary to combine the efforts of all interested in cluster educational systems organizations. It is needed to work out and generalize practical experience of DET use in different fields of school and university life.

We shall review some net educational projects promoting the ideas of cluster and cloud technologies that the authors have been conducting in the system of pedagogical education for many years.

**Virtual classroom** (<http://vk.kspu.ru/>, the authors and supervisors of the project are L.M. Turanova and A.A. Stiugin). This mega-project is aimed to organize cultural and enlighten activity of school students. It includes some sub projects:

- distance elective courses;
- virtual clubs and scientific societies;
- educational contests for school students;

- sites of educational Internet-projects of municipal governments of the Krasnoyarsk Territory.

Representatives of different municipal, state and scientific structures, organizations and establishments take part in development and realization of the project (Fig. 3).

The project “Virtual Classroom” is realized on the following principals:

- openness: it means potential possibility for any structure, organization, institution and private individuals to participate in educational process of the region.
- accessibility: it means possibility for every participant of educational cluster to realize his tasks independently on the level of existing private resources.
- unity of educational process is the leading principal of the cluster. It means the unity of cluster participants’ aims, i.e. when solving his problems everyone realizes state policy in the field of education.

***The project of the system organization of psychological and pedagogical consulting of the parents and professional support of the teachers of Taimyr Dolgan- Nenets Municipal Region on the basis of distance technologies*** (<http://vips.kspu.ru>, the author is A.A. Stiugina).

The project is directed to problem solving connected with traditions of family education weakening. “The temp” of life is getting faster and it leads to time limitation for close communication with family members, therefore its functioning gets worse. This situation leads to many problems of a child in behavior and study. Spiritual traditions, traditions of family education restoration and also psychological and pedagogical support in solving these difficulties will allow coping with or avoiding some of them. The parents of distant territories, particularly of Taimyr Dolgan-Nenets Municipal Region can experience the lack of such support because of the lack of singled-functioned specialists: infant and family psychologists and special pedagogue – psychologists. Many parents’ problems in questions of education and study can be solved by pedagogues and psychologists who have no any single specialization but with professional support of the colleagues. The majority of complaints to a pedagogue-psychologist is the result of long existing unfavorable for a child situation in family and also the parents’ choice of educational methods unsuitable for age and individual features of a child. The main part of mistakes made by the parents is the result of lack of information about this question. The problem of Taimyr Dolgan-

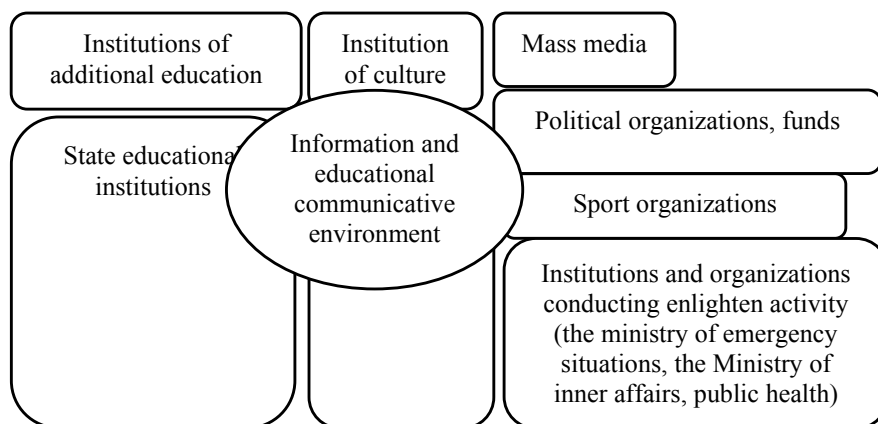


Fig. 3. Information and educational communicative environment of the project “Virtual Classroom”

Nenets Municipal Region is the lack of singled-functioned specialists of psychological and pedagogical qualification, organized professional interaction and limited resources for professional and personal self-development. The project was supported by Krasnoyarsk Regional Fund of scientific and scientific-technical activity support and it was tested on the territory of Taimyr Dolgan-Nenets Municipal Region under the support of administration of information and methodical support of distance education at Krasnoyarsk State Pedagogical University (KSPU) named after V.P. Astafyev.

***Distance education of students organized at KSPU named after V.P. Astafyev*** (<http://idiso.kspu.ru>).

The main part of population of Siberia feels need for constant improvement of education level and professional qualification that corresponds to general world tendency mentioned in researches by the range of authors (Andreev; Ovsiannikov et al, 2001; Stiugin, 2010; Federal Department..; Shashkina, 2013). Thus, for example, demand for university entrants for forms with the use of distance technologies of education at higher educational institutions in Moscow and Moscow Region is more than 50 thousand people; in St. Petersburg and Leningrad Region it is more than 20 thousand people; there is Krasnoyarsk Region among 15 other regions with quite high volume of potential demand for distance education (from 2 to 5 thousand people). Declared necessity to provide every person under the conditions of information society with the possibilities at any place and any time to get the necessary educational services of high quality that would satisfy his educational needs can be realized only under the condition of provision of the environment with information transmission, environment of interactive interaction of students with teachers in the process of training as well as adaptation of pedagogical technologies of education to the

conditions of distance education. An intensive experience of distance educational technologies has been accumulated in KSPU named after V.P. Astafyev:

- the system of inter session support of bachelor degree correspondent students with the use of distance technologies is made; electronic and educational environment for organization of cultural-enlighten and scientific research work with school students in different forms is created;
- separate forms of distance interaction with educational institutions on the territories of Krasnoyarsk Region within the frames of cultural and enlighten work with parents is tested.

Under the conditions of KSPU named after V.P. Astafyev's shift to the two-step model (bachelor and master's degrees) of higher education system according to "Bologna Agreement", integrative curricula were formed for correspondent form of bachelors' training in 7 qualifications where all subject and all qualification training was maximum unified, that allowed 3 times reducing expenses by the hour of the teachers. Saving the hours gave the opportunity to spend those hours on tutor support of the educational process and development of electronic educational materials for the students. Even so according to the demand of the state educational standard of the higher professional education the hours of class work with the teacher were minimized, timetable of educational activity between the sessions was introduced, that is supervised by the tutors. Thus the stages of formation (Fig. 4) and the model of organization of educational process (Fig. 5) in the system of education with the use of distance educational technologies at KSPU named after V.P. Astafyev are based on the principal of expenses optimization on educational process provision.

### The Stages of the System Formation

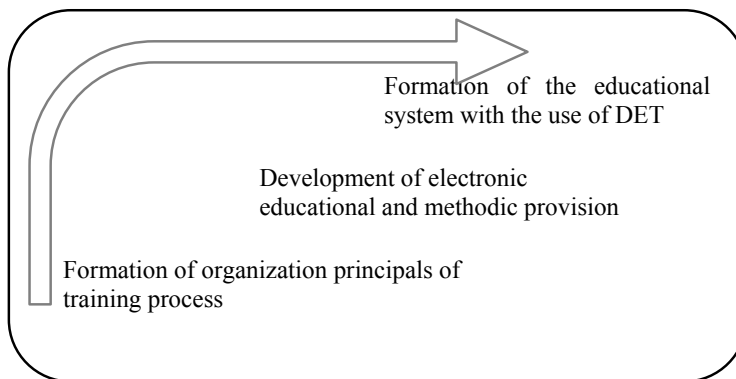


Fig. 4. The stages of educational system formation with the use of distance educational technologies at KSPU named after V.P. Astafyev

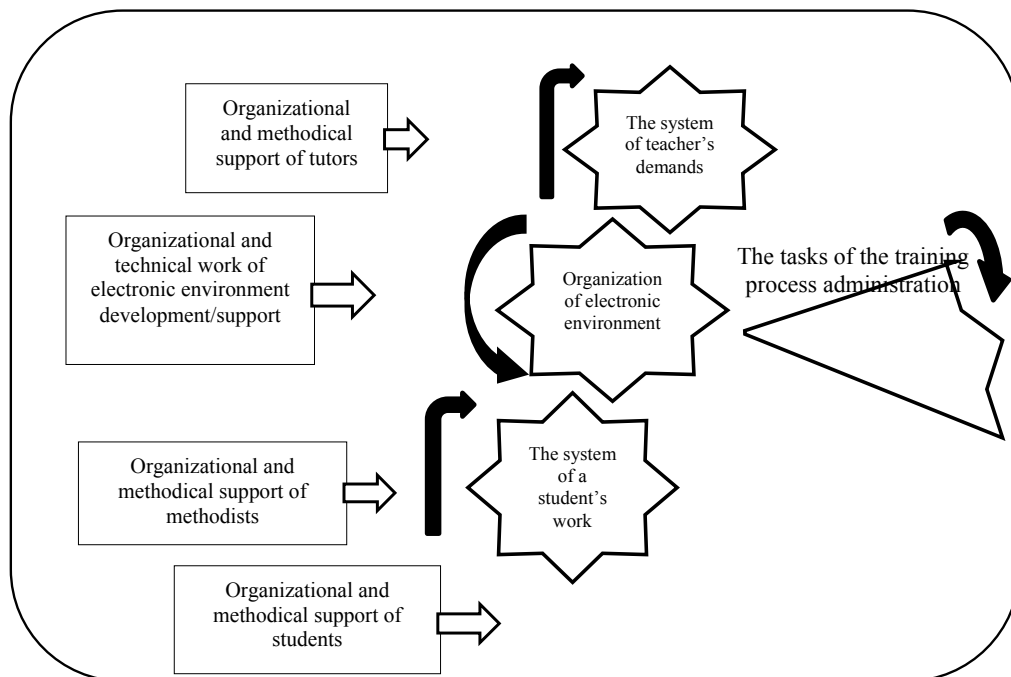


Fig. 5. The model of training process organization in the system of education with the use of distance educational technologies in inter session period on the basis of electronic educational environment (idiso.kspu.ru) at KSPU named after V.P. Astafyev

The main potential users of distance educational services are the range of social categories: university entrants, university students, teachers, statesmen, organization managers, jobless, disabled and inhabitants of distant settlements, military men and

so on. Students choosing education with the use of distance technologies at KSPU named after V.P. Astafyev (Stiugin, 2010) are mainly practicing school and kindergarten teachers. It is comfortable and economically beneficial for them to train not in traditional

forms. Distance training of bachelor students of naturally scientific, art, social-economic education and pedagogics is conducted at the faculties of pedagogics and psychology of childhood; primary school; informatics and computer science; physical training and sport; at the institute of pedagogics, psychology and administration of education, and organization of support of education in distance regime in inter session period is conducted by the administration of information and methodical support of distance education.

The students of KSPU named after V.P. Astafyev trained with the use of distance technologies are provided with the complete set ("case") of specially developed educational and methodical provision in every subject and with access to information and educational net of the university.

Distance educational technologies allow the students staying involved in the training process in inter session period, maintaining interconnection with the teachers. Schedule of the training process allows the students who passed the preliminary attestation in the subjects of an academic year successfully coming to the session to the Pedagogical University only once a year.

Distance technologies unlike traditional technologies of correspondent training really allow directing educational activity of a student in inter session period. Educational work is done on the basis of module object-oriented dynamic educational environment Moodle. It saves all users' actions; that disciplines not only students but the teachers. During the training period ethics of behavior on the site and responsibility are formed by the users. Many students gain useful experience participating in combined projects of the university with the distant territories of Krasnoyarsk Region. We speak about different educational, except for pedagogical workers

training, and cultural projects for territory inhabitants. As, for example, Days of KSPU named after V.P. Astafyev the program of them includes exhibitions, joint with students and school students concerts, "round tables" with education workers where actual problems of education and not only a distance one are discussed. Such new forms of cooperation appear as: joint scientific and practical conferences, lecture halls, museum programs and so on. Thus, pedagogical training doesn't narrow but, on the contrary, broadens potential possibilities for gained knowledge realization. Thus, high quality of a future teacher readiness at the university to the professional activity, realization of continuous advanced training of teachers in the process of their work, high quality of school students' training regardless to their place of living satisfying modern requirements of the society can be realized according to cluster model of distance education on the platform of cloud technologies and mega-clusters.

The model of the cluster system of social and pedagogical support of rural area and the Extreme North school students being developed by KSPU named after V.P. Astafyev by the scientific team is based on theoretical researches and practical experience of educational activity organization with the use of DET. Creation of the cluster system of social and pedagogical support of rural area and the Extreme North school students on the distance platform school-higher educational institution will allow integrating educational process of future pedagogical university teachers to real educational process of schools, forming electronic educational resources environment aimed to organization of virtual cultural and educational activities, reduce the lack of staff and educational problems of the days when students cannot attend the school because of frost in the Extreme North.



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## **Модель кластерной системы социально-образовательной поддержки школьников сельской местности и Крайнего Севера**

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*Статья представляет обоснование инновационной модели кластерной системы подготовки будущих учителей в педагогическом университете, повышения квалификации действующих учителей и социально-образовательной поддержки школьников сельской местности и Крайнего Севера на дистанционной платформе школа – вуз.*

*Ключевые слова: кластерная модель организации учебного процесса, интернет-проект, дистанционное образование.*

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