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## **CLUSTERISATION AND INFORMATION TECHNOLOGY IN ADVANCED TRAINING OF THE HEADS OF NETWORK EDUCATIONAL ORGANIZATIONS**

**Abstract.** The creation of strong basic schools with the network of branches and other networked educational organizations in the Ukrainian education system requires from leading cadres the possession of the basics of network management. The article deals with the questions of the process of forming professional competencies of heads of networked educational entities in conditions of postgraduate pedagogical education. The features of learning model which based on the active use of information and communication technologies are revealed have been disclosed; components of the open educational environment (cognitive, social and educational) and their influence on the process of training leading cadres; advantages of using Internet technologies for educational purposes. The article describes the experience of organizing a continuous educational process by using the funds of information and communication technologies: websites, distance learning courses, social communities, and other Internet services. At the same time, heads of educational institutions are united in cluster formations by type of educational institutions, the level of providing educational services, the direction of professional interests, preferences, and also for the joint development of managerial algorithms in certain typical situations and for solving typical professional problems. In such a model of learning, knowledge is produced by participants independently during active activity by joint search, processing, and analysis of information, solving problem situations, discussions, debates, etc.

**Keywords:** strong basic schools; branches; educational districts; network educational organizations; cluster formations; open learning model; ICT-based learning model; Internet services; social communities; websites; distance courses; managerial cluster; professional managerial competencies

**Introduction.** In the conditions of decentralization and reformation of education, the processes of introduction into the Ukrainian educational system of new types of organizations are becoming of particular relevance: hub schools with a network of branches. Such organizations have replenished a group of networked educational institutions, in particular, educational districts of different types.

Network educational organizations are characterized by the *territorial distribution* of network participants and the need to provide management processes (planning, organization, motivation, control) at a distance; *innovativeness* (insufficient experience of creating network educational organizations in the Ukrainian educational system and new approaches to managing them); *anisotropy* (presence of different social, geographical, economic conditions of the network actors); *heterogeneity* (the network organization includes different types of educational institutions - schools of various degrees, gymnasiums, lyceums, vocational schools and higher educational establishments, cultural institutions, health care, physical culture and sports, public organizations, enterprises, etc.); *dynamism* (the operating conditions of the organization are constantly changing); *the presence of additional management structures* (branch managers, deputy heads of branches); *decentralization* and *dominant horizontal ties* (Stoikova V. V., 2016, pp. 24–32).

Such organizations, by their structure, functions, management processes, peculiarities of the organization of the educational process, differ significantly from other general educational institutions (Stoikova V. V., 2016, pp. 24–32; Kravtsov A. O., 2010, pp.88–91). A significant amount of activity in them is provided by the virtual technology of the organization of work (Nebava M. I., Ratunjak O. G., 2012, p. 47–55).

**Formulation of the problem.** For ensuring the quality of the educational process in all structural subdivisions of the network educational organization, supporting the development of professional competencies of teachers, increasing the role of the school in the life of the community, organizing partnership relations with parents, community and social partners, the head of the educational institution has to possess various pedagogical and managerial technologies, be able to select them, apply in the most appropriate situations, produce new ones. Among such technologies, information and communication technologies (ICTs), in particular, Internet technologies, occupy a special place (UNESCO, 2009, pp. 23, 25, 54).

For one's turn, the introduction of ICT in pedagogical and managerial practice requires from the leader the formed skills in the using of various technologies, tools, and electronic content, and from the institutions of postgraduate education system is rebuilding and the creation of a supportive personally oriented professional and development environment for the rapid response to economic, social and evolutionary challenges.

Thus, in the educational sector there had become the certain systemic inconsistencies:

- between the presence in the educational system of network organizations – districts, hub schools and their affiliates, which need new management technologies by the level of formed expert professional competence of heads of educational institutions in the field of network management and use of Internet technologies;
- between the ordering and organization of training of management personnel for the management of various types of network educational organizations and the necessity to orient the educational process in the institution of postgraduate pedagogical education, taking into account the diverse professional needs of the directors of educational institutions, the heads of the branches and their deputies;
- between the intensive development of information and communication technologies, their integration into the educational sector and the degree of readiness of the heads of educational institutions to their implementation;
- between the necessity to constantly increase the expert professional competence of the heads of educational institutions (especially new types of educational organizations) and the impossibility of often and permanently leaving an educational organization without system management support, especially during the period of establishment.

In our opinion, resolving such inconsistencies will be possible through the introduction of clustered and Internet technologies in the educational process of postgraduate education institutions.

The domestic scientists such as V. Bykov, A. Velichovska, I. Vorotnikova, O. Zakhar, K. Kolos, V. Kukharenko, L. Lyahotska, N. Morze, O. Samoilenko, S. Sysoev, O. Spirin, O. Spivakovsky and others were giving their attention to the study of the introduction of Internet technologies in the system of pedagogical education.

Also, the theories of the introduction of clusters and cluster technologies (M. Kanavets, V. Knyagin, V. Kovalevsky, A. Marshall, M. Porter, R. Savonyuk, V. Sidorov, S. Sokolenko, V. Tolkovanov, D. Tyukayev, A. Yudanov, B. Yastremsky and others) have been acquired the significant development in the scientific circles. In particular, the studies of V. Tolkovanov, M. Kanavets, R. Savonyuk, V. Sidorov and others have been devoted to the use of clusters in the training system for civil servants.

At the same time, the practical implementation of the educational process in the system of post-graduate pedagogical education of the heads of network educational organizations by

means of cluster and Internet technologies is not sufficiently studied and needs systematic scientific substantiation.

**The purpose of the article is** - to summarizing scientific and practical approaches to the use of cluster associations and Internet technologies in training senior managers in the management of network educational organizations.

**The role of Internet technologies in designing an educational environment for the training of heads network educational organizations.** Internet technologies are in demand among a large number of users of the World Wide Web, so they can become a powerful tool not only to support the interpersonal communication of millions of people but also to receive education, professional development, etc.

The emergence of new requirements for the content of the professional competence of heads of network educational organizations, in terms of digital competence, imposes certain requirements regarding the technologies, forms, and methods of their preparation for such activities. According to Barcelos G.T. and Batista S.C. F., the formation of the competence of pedagogical staff in the skills of using information and communication technologies should be carried out using such technologies (Barcelos G. T., Batista S. C. F., 2013, pp. 8–21).

Among positive aspects of using Internet technologies for educational purposes V. Bykov, A. Velichovska, A. Gurzhii, O. Zakhar, V. Kukharenko, N. Morse, O. Orlov, E. Polat, O. Spivakovsky and others highlight the following: comfortable and habitual environment for students; various forms of interaction and communications; the orientation of the educational process according to the personal characteristics of the students (tempo, time, volume of tasks, form, and intensity of communication); the ability to compare their own educational activity with other participants; motivation of educational activity; removal of psychological barriers; the possibility of filtering information according to the relevant criteria; an economic effect, etc.

The study, conducted by Moreira J. A. and Monteiro A., in particular, confirmed that the creation and use of virtual environments in support of traditional forms of adult learning is essential for the promotion and strengthening of the teacher-student link, student-teacher, and student-student; ensuring effective interaction during the educational process and organization of joint productive activities (Moreira J. A., Monteiro A., 2010, pp. 82–94).

Also, according to the authors, learning using Internet services, in particular through websites, blogs, social networks, contributes to the formation of a stable motivation for learning and the effectiveness of education in general.

Skillful use of modern ICTs by an educational institution of any level in the learning process creates a multifunctional computer-oriented learning environment (Kolos K. R., 2013, pp. 11–12). Such an environment is aiming to the development of the professional and life competencies, effective communication of network participants, research and testing of innovative approaches to network management implementation, etc.

Such model of preparation of heads educational institutions for the competence of network management, in contrast to the traditional system of training (Table 1), has special characteristics (Morze N. V., 2003, pp. 12–25):

- in the center of technology learning - a student (the one who studies);
- the basis of educational activities - cooperation;
- students (those who study) play an active role in learning;
- the essence of technology - the development of abilities to self-education.

Table 1.

Comparison of traditional patterns of learning and ICT-based learning models (by N. Morze)

ICT-based learning model

Traditional learning model

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– <b>In the center of technology learning - a student (the one who studies)</b>	– In the center of learning - a teacher (the one who teaches)
– <b>Educational environment is an environment of cooperation</b>	– Educational environment - rivalry and competition environment
– <b>Students are active</b>	– Students are passive
– <b>The environment is focused on the development of self-learning abilities</b>	– The environment is focused on the transfer of knowledge (facts)

Thus, the effectiveness of the open educational environment, which is designed to ensure the formation and development of professional competence of the heads of educational institutions, in particular the hub schools with a network of branches, educational districts, etc., is provided with three components (environments / processes) that are created and operate in such a model of training of heads of educational institutions: cognitive, social and educational (Garrison D. R., 2007, pp. 61–72).

The first component – the cognitive environment / cognitive process is the basis for the development of reflective thinking and creates the basis for the learning of knowledge.

The second component – the social environment / social process – ensures the cyclical development of the learner in accordance with the thesis "development of the individual is carried out in society", manifested in communication within the community of participants, and provides the emotional context of the learning process.

The third component – the learning environment/learning process – consolidates the effects derived from the action of cognitive and social environments/processes and provides a general synergistic effect in the process of forming the professional competence of the heads of educational institutions.

Thus, the educational Internet environment created for the formation of the expert professional competencies of the heads of network educational organizations is characterized by the following features of the educational process: personal orientation (subjective component), content orientation (cognitive component), practical orientation (activity component), motivational orientation (competent component), communicative orientation (social component).

O. Zakhar in her research emphasizes the fact that the creation of educational information and education environment (IEE) significantly and positively influences the process of qualification improvement on the principles of direct and feedback through a system balanced combination of internal and external facts and conditions (Zakhar O. H., 2016, pp. 8–5).

At the same time, it contains the following components: organizational, content (information resources) and technological (ICT means of information interaction).

To the organizational component, the scientist refers the structures of the institution of postgraduate education, which provide support and functioning of the environment and a set of normative legal documents regulating the process of raising the level of qualification of teachers. To the content component, the author includes informational resources of educational, scientific, methodical, and supervisory and reference character. The technological component contains means of information interaction of all subjects of the educational process of professional development on the basis of integration of IT infrastructure of the institution of postgraduate education and cloud-oriented technologies. The well-coordinated interaction of all components ensures the continuous functioning of the IEE and access to its resources to all subjects of the educational process.

The analysis of the functioning of educational networks proves that network educational organizations have different specific features, are at different stages of formation and development; operate in different social, financial and economic conditions. These factors, as

well as the fact that the leaders of such entities have different degrees of expert professional competencies, need to seek ways to enhance educational effects in the training of managers to manage new types of educational organizations. Among them, cluster technology was identified.

**Cluster associations in the system of postgraduate pedagogical education.** The world experience of intensive development of many manufacturing industries is carried out according to cluster models of organization of the economy. In such models, development occurs through the development of new functions and the intensification of production through consolidated efforts of participants. Under conditions of globalization, cluster technologies have become a means of achieving significant competitive advantages of enterprises, institutions and entire manufacturing industries by creating a so-called "multiplier effect" (Tolkovanov V.V. and others, 2012, p. 11).

Involving participants into the individual, micro group, group, collective and mass forms of organization of the educational process ensures its personal orientation and orientation on the solution of the actual, for a specific expert professional, problems that manifest in his professional activities (Koloz K. R., 2013, p.15).

The founder of the cluster theory was M. Porter. According to his theory, "Clusters are concentrated according to the geographical feature of a group of interconnected companies, specialized suppliers, service providers, firms in related industries, as well as organizations associated with their activities (for example, universities, agencies of standardization, trade unions) In certain areas that are competing, but doing the same work together " (Porter M. E., 2011).

The modern notion of a cluster has expanded and is a subset of objects with certain sets of signs; a group of identical or similar elements collected together or close by one to one, etc. (Busol V. T., 2005, p. 544). According to R. Savonyuk, "cluster" can be defined as "a comprehensive method of organization and interaction, combining a common goal of a certain number of actors" (Tolkovanov V.V. and others, 2012, p. 13).

M. Porter proved that cluster formation formed under conditions of concentration (within a local area); competition (between cluster participants); competitiveness (due to high productivity); cooperation (involving related industries to produce a synergistic effect) (Porter M. E., 2011).

In the system of postgraduate education, the creation and operation of cluster associations have not yet been sufficiently developed. The scientific publications describe a cluster for the training of civil servants and officials of local self-government (Tolkovanov V. V. and others, 2012, p. 54). The model proposed by the authors of the cluster involves the integration of higher education institutions into a single network of educational institutions in the system of training of civil servants, local self-government officials and local council members – "Advanced Training Cluster".

The aim of such a cluster is "to facilitate the reform of the system for the training of civil servants, local self-government officials and local council members, ensuring the implementation of the innovative filling of the educational process and the formation of high-quality staff resources" (Tolkovanov V.V. and others, 2012, p. 86).

In our opinion, such a view of the cluster of a postgraduate education system is simplified, because it involves only a mechanical combination of the efforts of several institutions of advanced training, but does not ensure the variability of the learning process. In view of this, *we consider the cluster system of post-graduate education like a complex method of organizing the educational process, combining a certain number of subjects of activity at the common purpose and ensuring the variability of the educational process based on the principles of selectivity and electivity.*

**The Internet technologies in the training of management personnel in the Mykolayiv region within the framework of the scientific and educational project "Management cluster".** Into the postgraduate pedagogical education of the Mykolaiv region is paid considerable attention to organize and conduct both traditional (scientific and practical conferences, seminars, problem round tables, training seminars, consultations, trainings, etc.) as well as innovative forms of organization of scientific and methodological support of professional growth of the personnel of the system of general secondary education Such as: Internet communities, forums, chats, web expeditions, webinars, websites, distance learning. Such forms of organization of the process of formation of managerial competencies are used within professional cluster associations of executives (by types of educational institutions). Such cluster associations in the oblast were created in 2015 with the start of the implementation of a scientific and pedagogical project for the heads of educational institutions "Management cluster" (hereinafter – the Project).

The project is implemented through organizational, educational, educational, representative, research, coordination and information directions.

All activities are aimed at achieving the key objectives of the Project – to prepare the head of a new formation capable of becoming an educational leader, in accordance with promising world standards, on the ownership of the basics of network management.

Project participants are actively involved in the organization and conduct of socio-pedagogical research (surveys, questionnaires, and interviews), implementation of research and project activities related to the processes of reforming education; full-time and virtual benchmarking, on-line lessons, webinars, and more.

For the purpose of informational support of the project participants, the "Management Cluster" (<http://cluster.moippo.org.ua/>) and "Profile school" sites (<http://prof.moippo.org.ua/>) were created on the Mykolayiv Region In-Service Teacher Training Institute (MRISTTI) portal.

The "Management Cluster" site provides prompt information to the heads of educational institutions regarding news in the educational sphere and the regional educational system, provision of scientific and methodological and practical recommendations, popularization of perspective managerial experience. It is a platform for organizing managerial Internet lessons on topical issues of managerial activity.

On the site of the "Management Cluster", an initiative group of methodologists from rayon and city scientific and methodological institutions were created and launched an Open Educational Course (MOOC) "Organization which is learning". The course is not only free for access and study, but also can be replenished with new materials from those who have already received new knowledge and tested them in their activities. Evaluation of the educational process's performance is carried out using peering technology.

The "Profile School" website provides the heads of specialized educational institutions with normative, scientific and methodological and practical information on the implementation of profile education of students, the activities of educational districts and educational socio-cultural clusters, intercultural training and production combines (ITPC), and hub schools with a network of affiliates.

The site employs two platforms Moodle: one – "Open University of development of senior staff and pedagogical workers" – contains distance courses for heads of educational institutions, pedagogical staff for the creation of distance courses, their moderation, the introduction of distance learning in schools, the use of cloud technologies in management activities etc; The second – "Virtual profile school" – is a simulator for educators and managers for the creation and moderation of distance courses and contains elective courses developed by them, for the organization of profile education of students from rural regions of the region from different fields of knowledge (33 courses in all 11 subjects).

**The social communities in preparing managers of educational institutions for mastering the basics of network management.** At the Manifesto on Adult Learning in the 21st Century, prepared by the European Association for the Education of Adults, states that, in the conditions of informatization of society, e-learning becomes of great importance, which, on the one hand, offers many opportunities, but weakens the social aspect of education, which is important for many students.. Avoiding this is possible by using social communities for learning (EAEA, p. 10).

A. Yatsyshyn notes that due to the rapid growth of the number of users of social networks and the time they spend in social networks, as well as the ability to study, regardless of age and social status, at anytime and anywhere, in the presence of any device with an Internet connection has made virtual social networks attractive for use in education (Yatsyshyn A. V., 2014, pp.119–126).

With that in mind, during the e-learning for the heads of schools, we are widely used Google+ and Facebook platforms to organize interpersonal interaction between participants, where has been created the "Management Clusters" teaching communities. These communities are used to support traditional forms of learning, professional development of leadership in informal communication, as well as to extend time and space constraints in the traditional classroom.

The choice of platforms (Google+ and Facebook) was based on the following criteria: free, language customization, a variety of tools and convenient resources, popularity among users, simplicity and intuitive interface. The Google+ platform offers several Web 2.0 tools for knowledge management, such as sites, blogs, Google Drive – a service for saving and sharing files, as well as tools for collaborating and communicating. Both platforms allow you to customize and organize the environment according to the needs and preferences of the user.

Pedagogical Communities "Management Cluster" on Google+ (<https://plus.google.com/u/0/communities/117945098537117514404>) and Facebook (<https://www.facebook.com/groups/1621787338127764/>) allows the leaders of educational institutions in the professional circle to discuss topical issues of reforming the educational sector, share experiences, get the professional consultations, etc.

In the region created a Discovery group of principal Hub school leaders and their branches, "Management of Hub Schools", whose information support is provided in the Google+ environment, was created in the region to solve the problems concerning normative, informational, organizational and methodological support of network educational organizations (hub schools and branches, districts, clusters, etc.). (<https://plus.google.com/u/0/communities/113827487630581675740>).

The group deals with the issues of educational management in the following areas: organizational management (network organizations), strategic management (development and implementation of the strategy of development of the Hub school and branch network), team management (formation of an effective team), financial management, self-management, network management, etc.

The structural model of the educational Internet sub-environment created for the development of professional competencies of the heads of educational institutions of the Mykolaiv region is presented in Figure 1.

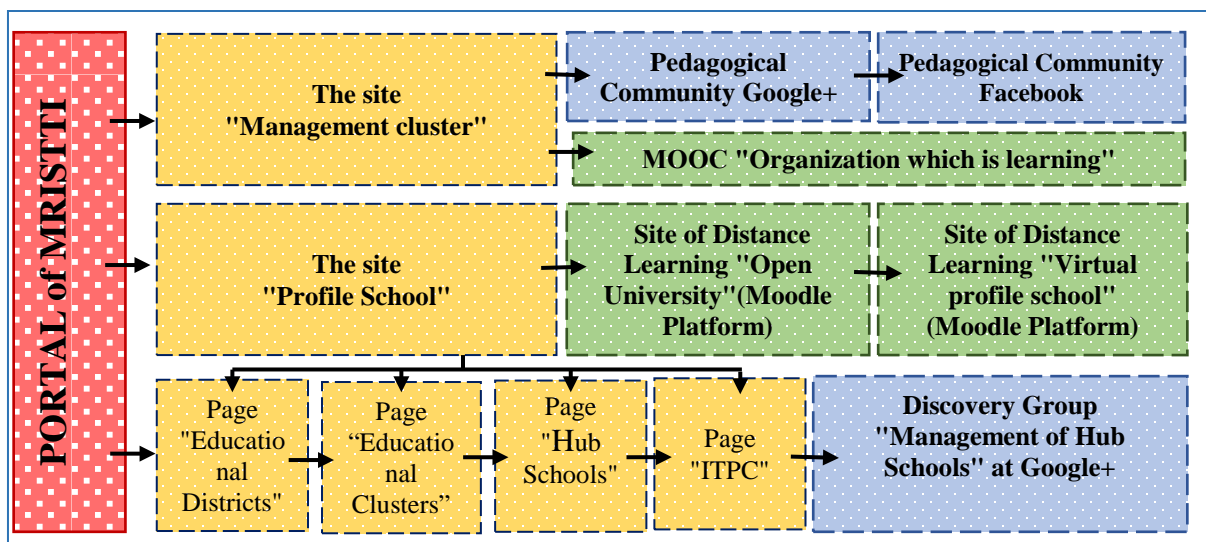


Fig. 1. Structural model of educational Internet-sub-environment of development of professional competencies of heads educational institutions of Mykolayiv region

Among other Google tools in the management training framework for managing network organizations, we are widely used: Google Drive, Google Docs, Google Maps, Google Forms.

A survey of heads educational institutions conducted in the Mykolaiv region showed that among the representatives of this category of teaching staff, 61,06 % favor and show interest in digital forms of learning and the combination of traditional active forms and digital learning (Figure 2.).

The research revealed the relationship between the preferences of the heads of educational institutions on the forms of organization of the educational process and the length of seniority in the management position. Young managers (experience 0–10 years old) prefer to choose forms where the learning process is organized with the use of digital education. While managers with significant senior management experience (over 20 years of age) prefer traditional forms of advanced training. Among the main reasons for this choice are the following: low level of knowledge of information technologies, lack of computer equipment, lack of connection to the Internet, a technological imperfection of Internet communication systems.

School directors and their substitutes identified the most effective means of obtaining new information on websites, blogs, forums and educational communities created in social networks (68 %).

Among the motives for choosing digital forms of education were the following: employment (managers of educational institutions do not have time to study for a long period of time in traditional forms); ability to manage information, time and place of study; practical orientation of the content (the study of practical experience; the use of educational content to specific managerial situations); expanding the network of professional acquaintances (the opportunity to exchange ideas, thoughts, resources, obtain competent advice, etc.); efficiency (the possibility to receive operational information on ways to prevent or solve problems in the management of the primary institution); the opportunity to study at an individual pace; possibility of individual communication with the teacher.

For 3 years the activity of the directors of schools and their deputies in the pedagogical communities "Managerial cluster" has increased in comparison with the previous years from 42 in 2015 to 257 in March 2017. Also, the forms of participation of leaders in communities have expanded: from passive acquaintance with the publications of moderators to commenting on publications, creating their own posts, organizing discussions, polls, etc.



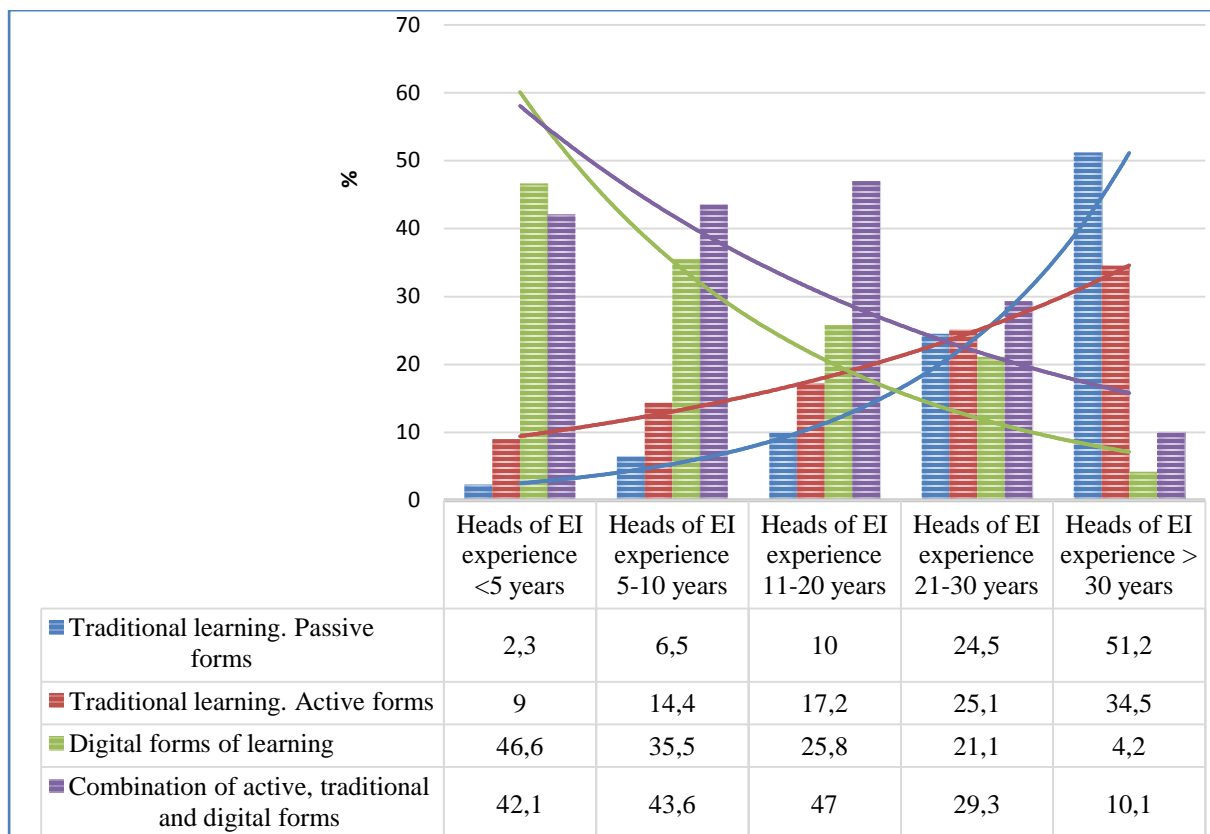


Fig. 2. Choice of the forms of organization educational process by the heads of educational institutions (EI)

28 % heads of educational institutions noted that they changed their attitude to the use of digital technologies in management after training in advanced training with the use of such technologies.

**Conclusions.** Thus, the main results of the introduction of cluster associations and information technologies in the improvement of qualifications of heads of network educational organizations in the region were:

- introduction of innovative forms of organization of the educational process in the institution of postgraduate pedagogical education;
- formation of expert professional competence of heads of educational institutions in the field of network management;
- individualization of the educational process of training of management personnel;
- increase of level of readiness of heads of educational establishments for use in professional activity of Internet technologies.

Our done analysis of scientific and practical approaches to the use of cluster associations and Internet technologies in training senior staff in the management of network educational organizations creates the theoretical basis for justifying the model of training of heads of educational districts, Hub school and their branches in institutions of postgraduate pedagogical education to ensure their activities, in particular organization of profile education.

## REFERENCES

Stoikova, V. V. (2016). education district: types, functions, structural model. *Nova pedahohichna dumka*, 3, 24-32 (in Ukrainian).

Kravtsov, A. O. (2010). Management of educational institutions on the basis of the principles of «network organization». *Management of the XXI century: efficiency, quality,*

sustainable development: Collection of articles on the materials of the X International Scientific and Practical Conference. SPb.: Izd-vo RGPU im. A.I. Gercena, 88-91 (in Russian).

Nebava, M. I. & Ratunjak, O. G. (2012). Management of organizations and administration: Tutorial. Ch. 1. Vinnycja, VNTY (in Ukrainian).

UNESCO (2009). The new roles of secondary school headteachers Interagency Group on Secondary Education. Secondary Education in the 21st Centur. UNESCO.

Barcelos, G. T. & Batista, S. C. F. (2013) Use of Social Networks in teacher training programs: A case study. International Journal on New Trends in Education & their Implications (IJONTE). T. 4, 1, 8-21.

Moreira, J. A. & Monteiro, A. (2010) The pedagogical work in presential and virtual scenarios in higher education. Education, Training and Technologies.T. 3, 82-94 (in Portuguese).

Kolos, K. R. (2013) Didactic Requirements for a Computer-Oriented Educational Environment for Postgraduate Pedagogical Education. T. 35. P.3, 11-21.

[http://nbuv.gov.ua/UJRN/ITZN\\_2013\\_35\\_3\\_4](http://nbuv.gov.ua/UJRN/ITZN_2013_35_3_4) (in Ukrainian).

Morze, N. V. (2003) Training of pedagogical personnel for the use of computer telecommunication. Computer-Oriented Learning Systems. 6, 12-25 (in Ukrainian).

Garrison, D. R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. Journal of Asynchronous Learning Networks, 11(1), 61-72.

Zakhar O. H. (2016). Methodical system of improvement of professional skill of teachers of informatics with the use of technologies of distance learning. Extended abstract of candidate's thesis. Borys Grinchenko Kyiv University. Kyiv (in Ukrainian).

Tolkovanov, V.V., Kanavecj, M.V., Savonjuk, R.Ju. & Sydorov, M.V. (2012). Clusters in the system of professional development of civil servants and officials of local self-government bodies: a directory. Kyiv – Simferopol. ARIAL (in Ukrainian).

Kolos, K. R. (2013). The main components of the computer-based educational environment of postgraduate pedagogical education institution. Zbirnyk materialiv «Reporting Conference IITZN NAP of Ukraine». Kyiv, 170-171 (in Ukrainian).

Porter, M. E. (2011) Competitive advantage of nations: creating and sustaining superior performance. Simon and Schuster (in English).

Great explanatory dictionary of modern Ukrainian language (2005). Busol V. T. (Ed.). Kyiv: Irpin (in Ukrainian).

The Manifesto of Adult Learning in the 21st Century. EAEA. Bryussel. (in Ukrainian).

Yatsyshyn, A. V. (2014) Application of virtual social networks for the needs of general secondary education. Informatsiyni tekhnolohiyi v osviti. 19, 119-126. DOI: 10.14308/ite000491 (in Ukrainian).