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The effective use of digital technologies in education: positive experience of regional innovation platforms

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Abstract — **The article presents the regional experience of creation and distribution of innovative educational resources for the organization of educational processes in educational organizations on the principles of inter-level networking.**

Over the past 10 years, the regional conditions of computerization of the educational environment in the Russian system of education have changed significantly: the number of computers, electronic boards, the quality of high-speed Internet increased. All this made it possible to use computer and mobile devices, electronic educational content in order to improve the quality and individualization of education even in remote rural areas. However these resources looked incomplete or less attractive than commercial educational platforms or social networks. The development of innovative infrastructure in the field of education and the emergence of regional innovative educational platforms in 2015 contributed to the identification and integration of modern, useful, successful practices of educational organizations in the development and implementation of electronic educational resources on the digital network platform. The study of this experience allows us to analyze the readiness of the regional education sector to solve the tasks set in the framework of the priority project "Modern digital educational environment in Russia" for the period up to 2024.

Keywords — digital educational environment, innovation platform, networking, education

I. INTRODUCTION

Digital technologies are becoming more widespread in the world. And if 20 years ago not all Russian schools were susceptible to technological innovation because they lacked the basic technological infrastructure, a sufficient level of competence of teachers, today this situation is changing drastically. Thanks to the state program of Informatization computers, local information networks, interactive boards and sets of multimedia equipment appeared in almost all rural schools remote from the center. Every year dozens of teachers take training courses on the programs of introduction of information and communication technologies in educational activities, author's manuals and distance courses in different school subjects are created. And the modern generation of students, which has grown up in an environment rich in information and communication technologies, can use a computer and a smartphone easily and is very responsive to the opportunity of applying their skills in the learning process.

The speed of dissemination of successful practices in the pedagogical community plays an increasingly important role in the widespread introduction of innovations in education, and, nevertheless, the main limiting barrier remains the difference in the conditions of access of all participants of the educational process to the high-speed Internet and local network service in educational organizations. This difference is particularly evident between the central and peripheral territories of the country. In the period up to 2024, within the framework of the approved national project "Education", significant changes and solutions to the main problems of development and improvement of the quality of education of all types and levels with the use of modern information technologies should occur through the implementation of tasks in the direction of "Modern digital educational environment in Russia".

II. THE INFORMATIZATION AND IMPLEMENTATION OF INNOVATIVE ACTIVITY IN EDUCATION

Pedagogical innovations in education

The implementation of the strategy of innovative development of the regional education system in Russia should be viewed from the perspective of the global trend of spreading the model of innovative pedagogy as a means of adapting the education system to the new challenges of the XXI century [1, 2]. The main objective is to organize educational activities so as to prepare young people for further

successful life in a changing society. According to some experts, success is ensured by human skills in searching, updating and using knowledge throughout life [3].

Innovative pedagogy is a set of educational technologies, new tools and teaching methods in the situation of interaction between student and teacher. Ideally, the process of acquiring knowledge should be enshrined in educational activities based on different projects and focused on real problems of real life. The role of the educator is to create an educational program that focuses on the interests of learners and the development of their future skills, and the processes of teaching, learning and assessment are built using information and communication technologies (ICT) that put the learner in the spotlight, support motivation to learn and provide diversity as well as accessibility to various resources [4, 5].

According to the leading researchers, pedagogical innovations are most effectively promoted through digital educational platforms, the so-called "School networks", which support communication between teachers and specialists by creating network communications. Consequently, digital educational platforms are an innovative tool with great potential for the development of cognitive, social and moral development of all participants [6]. The main advantage is the availability of communication between colleagues who have been engaged or are interested in similar educational and/or professional topics, providing methodological assistance in testing new forms and methods, dissemination of their own experience. Networking opportunities can also link them to teacher training centers.

Modern network communities are a group of "... users who communicate through Internet communication systems based on common interests, resources, and shared goals [7]. John Preece and D. Maloney-Krichmar gave a detailed description of the network community [8].

Thus, we can highlight the main distinctive feature - the network community is often based not only on the personal relationships of its members, but also on the exchange of information through digital technologies at a convenient time for participants and taking into account certain goals, professional or personal interests, assistance in raising the level of knowledge or acquiring new experience.

In the pedagogical community network interaction is more often used not only to organize professional activities but also it is necessary to achieve educational goals. Such communities are defined as educational. According to the definition of A. N. Sergeeva "…educational network communities are the communities of the Internet, whose activities are aimed at the implementation of educational tasks in relation to students and teachers as members of the community" [9].

The field of research concerning the use of the form of network communities in educational systems is very diverse and has been presented in a number of scientific areas:

1. The problems if it is reasonable to use educational resources in educational process with university students and the solution of basic tasks of professional activity of University teacher [10, 11, 12].
2. Works based on the aspects of networking students and teachers in school education [12, 13, 14].

These studies convincingly prove the feasibility of network interaction at all levels of education to solve a variety of educational problems.

The aim of this article is to study the experience of creating and using digital network communities in the regional educational system, their contribution to the development of pedagogical practice based on the use of ICT and describe the successful experience of creating educational network resources.

The development of regional innovative infrastructure in the sphere of education

One of the forms of co-organization of subjects of innovative activity in the regional education system and the place of development, approbation of practice-oriented knowledge is an innovation platform. According to G.A. Ignatieva, the innovation platform "...is a special form of organization of innovative activity" and also a way to implement the state innovation policy in the field of education, including the mechanism of creation, implementation and dissemination of system innovations [15].

The formation of the conditions of legal regulation of innovation in education began with the adoption of a number of legal documents:

● Order of the Ministry of education and science of the Russian Federation (Ministry of education and science) of June 23, 2009 № 218 "on approval of the Order of creation and development of innovative infrastructure in education";

● in the Federal law of the Russian Federation of December 29, 2012 N 273-FZ "about education in the Russian Federation" it is normatively assigned to the educational organizations the right to: possibility of implementation of educational process with use of electronic training (ET) and distance educational technologies (DET); creation of digital (electronic) libraries; development of innovative activity in the field of education;

● Federal state educational standards of secondary General education, approved in 2012, declare the presence of information and educational environment (IEE) as one of the conditions for the implementation of the modern educational process.

Further development of innovative activity in educational institutions is regulated by regional legislation and is closely related to the development of innovative infrastructure of a particular region and the implementation of the main measures of socio-economic development. Thus, by 2015, an innovative infrastructure consisting of educational institutions recognized

as a result of expert selection by Federal and regional innovation platforms had been formed in the country.

In the Republic of Karelia since 2014 the State Educational Organization of the Republic of Karelia «Educational Development Institute» (SEORK «Educational Development Institute») annually holds a competitive selection of innovative projects and programs submitted by educational organizations engaged in innovative activities in the field of regional education. The procedure of the examination of the projects submitted for the competition is divided into 2 stages. At the first stage, an expert group consisting of at least three experts from among the representatives and specialists of regional and local authorities, the regional scientific and pedagogical community, independent experts in the field of education evaluates the established criteria:

- compliance of the subject and content of the project with the priorities of the state program of the Republic of Karelia "development of education", approved by the decree of the Government of the Republic of Karelia;

- quality of the project description;

- the degree of novelty of the project;

- availability of individual features of the project, reflecting the specifics and characteristics of the organization;

- readiness of the project to realization (the quality of planning, resource and management support, the level of organization of network interaction with other institutions (if necessary);

- instrumental nature of the project (possibility of adaptation to the conditions of other educational organizations).

Projects that have received a positive expert opinion of the majority of members of the expert group and on the basis of ranking projects in terms of their importance for the development of the educational system of the Republic of Karelia, the list of organizations recognized as innovative educational sites approved by the Board of the Ministry of education of the Republic of Karelia are allowed to participate in the second stage.

Within two years, the regional innovation platforms can work with the support of regional authorities in topical areas of development of the regional educational system: modernization of the content and technologies of preschool, General and additional education, the introduction of modern models of children socialization, individualization of the educational process, inter-level networking of educational organizations.

III. RESOURCES OF NETWORK INTERACTION OF INNOVATIVE EDUCATIONAL PLATFORMS

Interaction of regional innovation platforms, geographically remote from each other, located in different (rural and urban) municipalities, in the usual traditional forms of conferences, seminars is gradually losing its relevance due to the time and material costs of participants. At the same time, new forms of online interaction through modern means of communication-webinars, Skype conferences are limited both by the choice of the way of presentation and exchange of information, and by the limit of the time allocated for this purpose. Meanwhile, active joint work, informal communication between sites is an important component of innovation. It promotes the growth of professional competence of teachers, the accumulation and implementation of educational resources for collective use.

To solve the problem of contradiction between innovative sites and restrictions of permanent access due to the territorial remoteness, the idea of creating a regional information and communication environment of the pedagogical community of the Republic of Karelia was initiated.

The network educational community of regional innovative platforms "Innovations in education" in the Republic of Karelia began its activity in 2015 as a result of recognition of 6 educational organizations as innovative platforms. This network resource, organized with the support of the regional Ministry of education, created in the framework of promoting the development of innovative infrastructure in the field of education, has opened the opportunity for all stakeholders to communicate and carry out joint activities by means of digital technologies for the implementation of innovative projects and programs.

The main objectives of the network community of regional innovation platforms "Innovations in education" were:

1. Information support of activities: publication of news, announcements, invitations to joint events (with customized e-mail alerts to each member of the community).

2. Creation of a Bank of educational and methodical materials: placement of documentation, reporting and other materials on the results of innovative platforms that do not provide for publication in the public domain in the community.

3. Organization of internal professional expertise and discussion of teaching materials, reporting of regional innovation platforms on the implementation of innovative projects and programs by both curators and all members of the community.

4. Monitoring implementation of the timeliness and completeness of reporting on the results of the regional innovation platforms.

5. Organization of informal interaction between members of the community – communication in forums, internal messages, discussions.

The platform for the network community was the system of distance learning Moodle SEORK «Educational Development Institute». The main factor in favor of the choice of this

platform was the fact that the system is already well known to the pedagogical community of the Republic of Karelia. In recent years, it has been the basis for distance learning programs, network workshops, distance Republican competitions. An important argument in favor of the choice of this system was the possibility of its free use. Also, Moodle allows you to implement network communication of community members on the Internet through both synchronous and asynchronous tools, has an intuitive interface, the possibility for community members to publish materials (including photos and videos), no advertising. Thus, the system meets the needs of the community and contributes to the solution of all tasks.

The main thematic sections were identified in the structure of the community: "Organizational", "Forums", "Platforms of educational organizations".

The organizational section was intended to place normative documentation on functioning of innovative platforms:

- orders, regulations, work plans, reporting schedules, reporting forms;

- invitations to events (refresher courses organized within the framework of the activities of the sites, seminars, contests, etc.));

- announcements and announcements

- The section "Forums" suggested the organization of communication between members of the community, in particular:

- discussion of teaching materials created in the process of working on an innovative project or program, reporting of regional innovation platforms on the stages and results of the implementation of innovative projects and programs by both curators and all members of the community;

- topical issues, specific solutions to problems arising in the course of work.

The problems of the questions discussed in the forums could be asked by both curators and members of the network community. Technical ability and access to the creation of forums have been configured for each member of the network community.

Each innovative educational platform was given the right to place information about its activities in the section "Platforms of educational organizations" in the thematic blocks: "news", "Reports", "Methodical materials". Access to the materials was open to all members of the network community.

The development of the network community was carried out through the active participation of all its members in the provision and publication of materials, communication in forums and through personal messages, examination of published methodological developments. Every year new members joined the community.

As a result, by the time of summarizing the activities of innovative sites for the implementation of innovative projects and programs in 2018, the network community was a self-sufficient resource with a clear and logical structure, user-friendly interface, modern design, high attendance activity.

If in 2015 the community included 6 innovative platforms that United teaching staff of 9 educational organizations of the Republic of Karelia, by 2018 their number increased to 10. These included educational organizations of different levels of the regional education system: preschool, secondary school, secondary vocational and additional education. The geography of participants expanded: 2 urban districts and 3 municipal districts.

The total number of members of the community annually is more than 50 people, including: 2 technical specialists from among the staff of SEORK «Educational Development Institute», 6 curators of innovative projects and programs, 2 specialists of the Ministry of education and some representatives of innovative educational platforms.

During the implementation of innovative projects and programs in the community more than 20 reports on the activities of innovative platforms (quarterly), methodological developments in the form of electronic cases and about 18 sets of teaching materials and authoring have been laid out. All materials are subject to expert evaluation, discussion by members of the community. Some materials are placed in open access on the website SEORK «Educational Development Institute» with the author's permission.

For an objective assessment of the activities of the network community, we conducted interviews with teachers, educational organizations involved in the implementation of innovative projects and programs, and the activities of the network community. A summary of the interview results showed:

- more than 93% of teachers-members of the community noted the importance of networking to increase and stimulate motivation to work;

- 85% of teachers answered that by means of network communication with colleagues on the pages of forums, personal messages of the community, they managed to solve specific problems arising in the process of implementation of the innovative project;

- 65% of teachers believe that network consultations of project curators in remote mode are much more convenient than face-to-face, because they allow to work asynchronously, do not require time coordination;

- 78% of members of the community publication of news and announcements allowed to be always aware of current events, and, therefore, contributed to the active participation in the events;

- 65% of teachers noted that despite the low level of knowledge of modern technologies and lack of experience in social networks, did not experience difficulties and psychological discomfort when working in the network community.

Analyzing the above results, we can state that the use of digital technologies, in particular, the organization of network interaction of regional innovation platforms, has a positive impact on the productivity and quality of their work, the emotional attitude of teachers. This is especially important for innovative sites located in rural areas.

The effectiveness of the digital resource to promote the development of the pedagogical community "Innovations in education" of the Republic of Karelia is determined by the involvement and mutual influence of all participants and is due to the fact that it:

- continues its activities to the present moment;

- helps to monitor the dynamics of their own results based on the comparison and analysis of the activities of colleagues, which certainly stimulates the need for self-realization and motivates to set and achieve new goals;

- contributes to the search for collective solutions to specific practical educational problems;

- initiate a joint discussion of the intermediate results, making recommendations and assisting in the operational control of the activity.

IV. DISCUSSION

The education system in order to be effective must reflect fully the needs and prerequisites for changes in modern society. Today, innovations in education are considered not only as innovations, but also as an integral element of society in the period of digitalization of economic processes. Therefore, all innovations should eventually lead to a multiplication of learning outcomes.

The essence of digital technologies in education is to create and apply proactive methods to the education, training and professional development of new generations.

Any innovation, regardless of the degree of study can not be effectively implemented in the educational process without taking into account the system processes. Consequently, there are some difficulties in understanding how to introduce innovations. In the process of formation of innovative platforms there are a number of problem areas the elimination of which will enhance the efficiency of digitalization processes in education.

In our opinion, the first zone of "discomfort" is the difference in the readiness of the subjects of education to network interaction. Depending on the degree of economic development of municipalities and their remoteness from the administrative center of the region, the insufficient readiness of the pedagogical community to network interaction in the educational process is more reflected. Also there is a lack of theoretical, methodological and practical experience of subjects of the education system to implement educational programs in the form of network interaction. The question of the effectiveness of technological and technical support of these processes is relevant.

The second area of growth is the legal regulation of network interaction. The lack of a unified network of educational infrastructure and insufficiently developed system of legal documents regulating the processes of creation, development and implementation of digital innovations between universities and educational organizations do not allow to combine material, technical, information, human and educational resources.

The third zone is directly the complexity of the implementation of network interaction. The solutions of questions of coordination and efficiency of management of educational organizations engaged in the training of teachers able to work in the network space are topical. Another important question is how to encourage the subjects of education to implement network forms of interaction? It is necessary to study the aspects of differentiation of responsibility between the subjects-participants of network interaction in obtaining educational results.

The study of the regional experience of successful practices in the identification and recognition of educational organizations as innovative educational platforms indicates the creation of a single informational and educational space, as well as the solution of socially important task for the economy of the country -targeted training of specialists in demand in the labor market.

The creation of innovative educational platforms and the development of network interaction in the educational process allows us to solve a set of tasks that were previously unattainable for individual subjects of education.

Digitalization of education allows to create conditions for generation, exchange and use of teaching and information resources for personal and professional development.

The formation of a new digital culture in society through network education at the stage of personal and professional formation of labor resources allows to prevent a number of socio-cultural risks in advance.

Promising areas for improving the efficiency of digital technologies in education in the near future should be:

1. The establishment of a system of incentives for educators and teachers to the creation and use of innovative digital technologies.

2. The formation of a unified educational network of digital technologies for the accumulation of the best experience and dissemination of practices.

3. The organization of discussions, development of tools and techniques to neutralize the above mentioned problem areas.

Acknowledgment

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