

Implementing the Model of Specialized Education Based on the Principle of Distributed Responsibilities of Educational Cluster Participants

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ABSTRACT

The article presents the results of a research on organizing specialized education in Tomsk Oblast of the Russian Federation, which was carried out by the Tomsk Regional Institute for Advanced Training and Retraining of Educational Workers. The research identified the background, conditions and models for organizing specialized education in Tomsk Oblast. A variety of methods was applied, including theoretical (e.g. the analysis of monitoring data on the organization of specialized education; and the analysis of the scientific, methodological and regulatory framework for organizing specialized education) and empirical ones (e.g. description, comparison and situation analyses; pedagogical observation and accumulation of best teaching practices; pedagogical experiment within the educational process; and the methods of mathematical treatment of the data received). The topicality of the research subject stems from the insufficient substantiation of the 3D model of organizing specialized education in secondary school in the conditions of transition to the Federal State Educational Standard of secondary general education since 2020. The federal standard seriously affects the organization of specialized education at the level of secondary general education. A special focus in the article is given to network, system and activity approaches in the organization of specialized education, as they form the basis of the Federal State Educational Standard of secondary general education. The authors present an educational cluster model, centring on the understanding of a cluster as integration of different institutions within the municipal area (schools, secondary vocational education institutions, higher professional education institutions, supplementary education institutions for children and adults, career guidance centres, and companies operating in various fields of activity, etc.) that augment each other's potentials to implement extensive education programs of general education and introduce specialized educational content in order to provide pre-professional training in general education. The model has been practically approved in Tomsk Oblast, and can be implemented to organize both group specialized education and education based on individual curricula.

Keywords: *specialized education, individual educational trajectory, clusters, multidisciplinary training, networking, networking educational program*

I. INTRODUCTION

Currently, the importance of the practical component in the understanding of modern mechanisms of school education regulation (specialized education in particular) in the system of general education of Tomsk Oblast is widely recognized. When taking advanced training courses, teachers study teaching aids, technologies, methods and ways of organizing the educational process. Teacher training programs adequately consider and present the following aspects:

- the theory of specialized education;
- the theory of providing pre-professional and specialized education;
- the issues of specialized education management;
- professional self-identification in specialized education;

- the issues of training teachers and authorities for further implementation of specialized education, etc.

Therefore, the problem that requires special attention in Tomsk Oblast is the adequate adaptation of scientific experience and the effectiveness of its application when developing syllabuses for academic subjects of grades 10-11.

Solving this problem resulted in the need to identify the background for the introduction of the Federal State Educational Standard of secondary general education and analyse the conditions for its introduction in schools of Tomsk Oblast. Additionally, it required studying the regulatory, legislative and methodological framework for the implementation of specialized education in Tomsk Oblast. These activities were undertaken concurrent with the work to systematize models of organizing specialized education in general educational institutions.

The annual monitoring data on the organization of specialized education in the institutions of general educational in Tomsk Oblast (first collected in 2016) were the key information source for the research. Interpretation of the obtained results proved the objective need for Tomsk Oblast to develop an integration model to interact with vocational education institutions, higher education institutions (military, pedagogical, agricultural, etc.) and (or) institutions of the corresponding departmental affiliation. Thus, the result of the research was developing a new (cluster) model of specialized education (hereinafter referred to as the Model).

The Model is developed around the principle of distributed responsibilities of the educational cluster participants. It enables coordinated activities between the participants and allows reaching the ultimate objective - training in-demand professionals for the region. When distributing responsibility within the educational cluster, the experience of organizing specialized education in schools of Tomsk Oblast in the period of 2016-2020 is taken into consideration.

Thus, solving a theoretical problem conditioned by new external challenges and specifics of general education modernization at the present stage, has led to the development of a new workable, science-based and research-proven approach focusing on the pre-professional education in the individual region.

II. THE BACKGROUND FOR ORGANIZING SPECIALIZED EDUCATION ACCORDING TO THE FEDERAL STATE EDUCATIONAL STANDARDS OF SECONDARY GENERAL EDUCATION IN SCHOOLS OF TOMSK OBLAST

In order to perform this task, two studies were carried out: the analysis of monitoring data on the organization of specialized education in general education institutions of Tomsk Oblast and the comparative analysis of monitoring data for the period of 3 years. The analyses revealed several inconsistencies: between a variety of specialized education models in schools of Tomsk Oblast and the insufficient use of the network model of specialized education in the conditions of the introduction of the Federal State Educational Standard of secondary general education; between a variety of students' interests and inclinations and the insufficiency of personal and professional self-identification of students in high school; and between a variety of educational requests from both students and their parents (legal representatives) and traditional forms of educational process organization.

The purpose of conducting the annual monitoring is to collect, process, analyse, store and disseminate relevant and reliable information about the impact of educational activities of specialized education in general educational institutions of Tomsk Oblast in 2016-2020. The monitoring is performed based on reports by local public administrative authorities in charge of education. The system and educational outcomes of specialized education in general educational institutions of Tomsk Oblast that implement programs of secondary general education are considered to be the object of the monitoring.

It is essential to emphasize that the number of research participants is increasing year on year. Thus, in 2017, specialized education covered 6,676 students in 258 educational institutions (63% of the total number of school students); in 2018, - 7,136 students in 265 educational institutions (69%) respectively; in 2019, - 7,685 students in 291 educational institutions (76.6%). This annual rise is due to three factors: intensified private housing, growing settlements around the regional centre and new educational institutions being established; the introduction of specialized classes of grade 10 in schools, where they used to be not in demand; and the introduction of the Federal State Educational Standard in a number of secondary general education institutions in proactive mode, which implies specialized education only.

According to the latest monitoring, the total number of full-time general education institutions in Tomsk Oblast was 291 (out of 311 general education organizations in Tomsk Oblast). In rural areas, there

were 2,702 school students in grades 10-11, with 1,765 (65%) of them following specialized education plan. In regionally governed cities, 7,953 school students studied in grades 10-11, with 5,920 of them (74%) following specialized education plan. 12 of these general education institutions (382 school students, 382

of them following specialized education plan) operated according to the Federal State Educational Standard of secondary general education in proactive mode, while the rest followed the framework curriculum of 2004 ("Fig. 1").

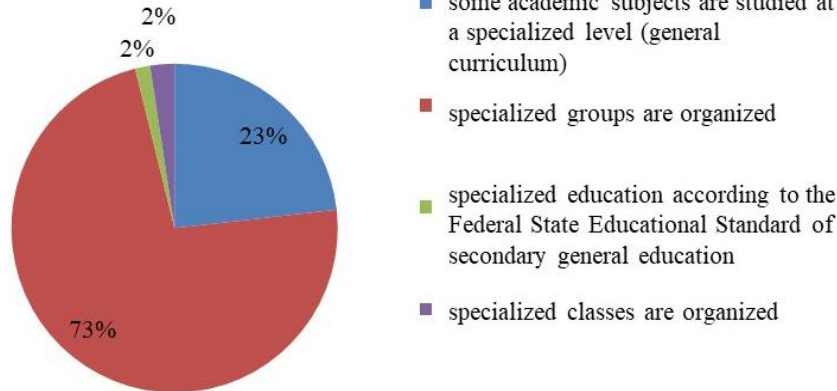


Fig. 1. Organization of education in grades 10-11 in the 2019/2020 academic year.

In the course of the study, the authors classified currently existing and operating models of organizing specialized education in secondary schools, including those based on network, system and activity approaches, including:

- models of organizing specialized education and training in rural areas through simple partnership or a network of educational institutions;
- models based on cooperation with secondary vocational education institutions, higher education institutions, institutions of supplementary education, institutions of supplementary vocational education, other educational institutions, and institutions of different departmental affiliation;
- models exploiting the resources of summer schools and subsequent support;

- models of creating separate specialized schools or resource centres;
- models based on supplementary education institutions for children and adults.

As the study showed, 98.7% of all educational institutions in Tomsk Oblast apply the model of intra-school specialized activities. According to the monitoring data, there is only one school - in the city of Seversk (0.6%) - that implements specialized education through network interaction. 33 general educational institutions (11.3%) enter into contracts with supplementary education institutions and institutions of secondary vocational and higher professional education ("Fig. 2"). Thus, 98% of general education institutions of Tomsk Oblast do not use the resources available in the region to organize specialized education for high school students.

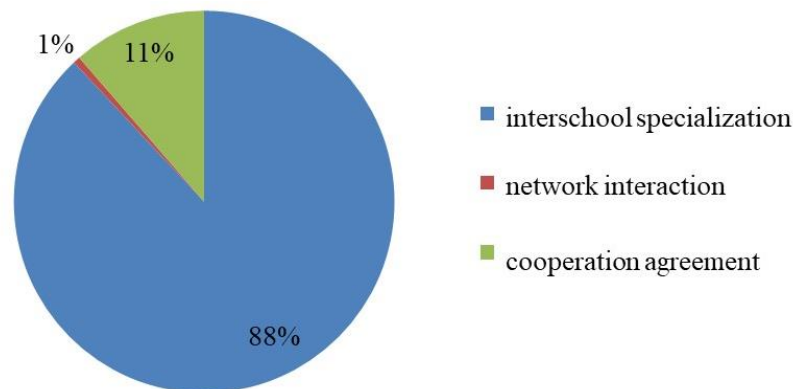


Fig. 2. Selecting a model of specialized education in Tomsk Oblast.

The conclusions made on the obtained data testify a number of challenges for the majority of education models under analysis:

- specialization that school students choose in grade 10 of general educational institution does not often relate with the major they choose when entering professional education institutions. 35% of students cannot make their choice of specialization by grade 10 and continue their studies following the general curriculum;
- 22% of graduates of specialized classes/groups of general educational institution of Tomsk Oblast do not start professional education at all. Meanwhile, this figure directly correlates with the remoteness of general educational institutions from the regional centre;
- specialized education is mainly designed for students motivated towards higher professional education (1,968 people).
- the capacities of the systems of secondary vocational education and higher professional education are less actively used for the purposes

of school students' professional self-identification (686 school students);

- the choice of professional specialization does not correspond to specialization that graduates have when studying in general education institutions of Tomsk Oblast;
- when implementing any of the models, the factor of regional labour market demand is not taken into account. This is one of the reasons for the outflow of graduates of general education institutions from Tomsk Oblast to other regions (12% of all grade 9 graduates).

The monitoring allowed identifying the level of school graduates' competence in subjects of specialization. The main criteria for assessing the impact of specialized education were the number of graduates in 2019 who entered higher and secondary vocational education institutions in line with their specialization (as of September 1, 2019) and the number of graduates of specialized classes/groups who decided not to continue their studies in professional education institutions ("Table I").

TABLE I. ANALYSIS OF STUDENTS' MOTIVATION TOWARDS SPECIALIZED EDUCATION

Specialization	The number of school students having chosen a particular specialization	% of school students who continued education in line with their specialization
Mathematics and Physics	711	86%
Physics and Chemistry	33	67%
Chemistry and Biology	283	80%
Biology and Geography	10	33%
Economics	374	68%
Humanities	460	78%
Philology	10	67%
IT	185	87%
Sport and Defence	18	51%
General	538	43%

As can be seen from the table, the number of those who continued their education in line with their specialization is significantly lower than the total number of graduates.

The analysis of admission figures revealed a lack of motivation in graduates of general educational institutions of Tomsk Oblast towards further professional education in line with specialization chosen at school. This cannot but testify the insufficient level of the organization of specialized education ("Table II"):

TABLE II. ADMISSION RESULTS OF THE GRADUATES FROM GENERAL EDUCATIONAL INSTITUTIONS IN TOMSK OBLAST

The number of school graduates from specialized classes /groups	Graduates who did not continue their education	
	Total number of graduates	Those who studied in specialized classes /groups
4,897	683	488

The conducted monitoring also allowed determining the demand for professional education in the institutions of Tomsk Oblast among graduates of specialized classes/groups ("Table III"):

TABLE III. ADMISSION RESULT OF THE GRADUATES FROM SPECIALIZED CLASSES/ GROUPS WHO CONTINUED EDUCATION IN TOMSK OBLAST

Admission rate of school graduates from specialized classes /groups	Out of them, % of school graduates who continued studying in Tomsk Oblast
78%	25%

Graduates of Tomsk Oblast continue their studies in professional education institutions in the following majors ("Table IV"):

TABLE IV. THE CORRELATION BETWEEN SPECIALIZATION AT SCHOOL AND THE CHOICE OF MAJORS TO BE STUDIED IN FURTHER PROFESSIONAL EDUCATION

The number of school graduates in key specializations	Distribution of applicants (the number of graduates who continued education in line with their specialization at school)			
	<i>Secondary vocational education</i>		<i>Higher professional education</i>	
	Tomsk Oblast	Other regions	Tomsk Oblast	Other regions
4,609	946	110	2,015	547

The next stage of the research focused on the difficulties that the schools of Tomsk Oblast had mentioned in their reports. The analysis of this data revealed the primary reason for specialized education not to be comprehensively introduced – it is more resource-consuming than conventional, undifferentiated education. All rural schools expressed the need to attract extra resources to ensure individual approach to teaching their school students.

Thus, having performed the analysis of the conditions and models of specialized education, the authors recognized the importance of studying the methodological and regulatory framework for organization of specialized education at both the federal and regional levels of education management, even though this task had not been initially set.

III. STUDYING THE CONDITIONS FOR THE INTRODUCTION OF THE FEDERAL STATE EDUCATIONAL STANDARD OF SECONDARY GENERAL EDUCATION IN SCHOOLS OF TOMSK OBLAST

In the course of the study, the authors addressed the methodological and regulatory conditions for the implementation of specialized education currently existing in schools.

It was discovered that the federal regulatory framework had experienced significant changes and in 2012, a new Federal Law "On Education in the Russian Federation" was adopted. It has redefined the concept of specialized education, which is as follows: "specialized education is a way of organizing educational activities upon educational programs of primary general, basic general and secondary general education" (Part 4, Clause 66). Some clauses of the law rearrange the system of organizing specialized education. Thus, the term "underfilled school" is no longer found in the text of the law; schools have gained independence to design syllabuses; standards for the student transportation to and from school have been

established, etc. However, the law has several inconsistencies. For instance, Part 4 of Clause 66 creates conditions for early specialization (in grades 4-9), though, the concepts of "basic" and "specialized" levels of education are introduced only for secondary general education. Clauses 6 and 28 of the Federal Law No. 273-FZ limit intervention from regional and local authorities in the educational activity of schools, but their funding remains under control of the government authorities (Clause 60).

The Federal State Educational Standard of secondary general education, dated the same year, has established new specialization options, but the number of possible specialization options on the list has been reduced. However, explanatory documentation on establishing the new education system at the federal level are insufficient. The Concept of specialized education, which was approved by the Order of the Ministry of Education of Russia No. 2783 dated July 18, 2002, has not been cancelled, and the models in the Concept are still relevant and applied in schools in Tomsk Oblast [1].

The guidelines for updating the content of education and developing specialized education are laid down by strategic documents at the federal level (can be found in the reference list of the present article). They clarify that the objective of updating the Federal State Educational Standard and basic educational programs stems from the goal of scientific and technological development of Russia.

There is a characteristic feature distinguishing the general education system of Tomsk Oblast: there is a significant number of rural schools, most of which are distant from the regional and municipal centres. This may pose a considerable challenge to the implementation of the above-mentioned requirements. The implementation of the Federal State Educational Standard of secondary general education is associated with a number of tasks that will have to be performed: rearranging the system; revising approaches to

multidisciplinary education; and designing new regulations and standards.

At the level of regional authorities in charge of education in Tomsk Oblast, the above-mentioned tasks have been actively addressed for the last three years. Within the present research, the authors studied the Orders of the Regional Department of general education, relating to the research topic. The documents under analysis define the activity in three directions:

- updating the content of education in accordance with the six new subject concepts by the Ministry of Education of the Russian Federation (2018);
- updating the content of specialized education;
- updating the content of education according to new requirements for the result of the Federal State Educational Standard of secondary general education.

The logic underlying the development of the general education system of Tomsk Oblast shows that its characteristic feature is integrating efforts of different educational service providers to implement the tasks of the government by means of aggregating their resources. However, the established system does not coordinate the activities of all participants in training in-demand specialists for Tomsk Oblast. The analysis of the reasons for this problem has revealed the common challenges for the region, which include underdeveloped regulatory framework, insufficiently formulated financial and economic mechanisms, and the insufficient staffing in the specialized educational system. In these conditions, performing the task of pre-professional education of school students is severely undermined.

The research has demonstrated that there are two network model forms being implemented in specialized education in the region: network interaction and network forms of implementing educational programs. The first form is well mastered by schools, but is not yet made active use of when organizing specialized education. The second form was introduced in 2019, though not in all educational institutions, primarily in the Growth Point Centres and schools, which are practically approving the project in the “Technology” subject. Nevertheless, even in the institutions, which actively apply these forms, regulatory conditions are not always observed.

In search for ways to implement the forms of network interaction, the authors resorted to modern Russian scientific experience. However, the study has shown that the experience accumulated in other regions of Russia (e.g. Penza, Novosibirsk, the Ural region, etc.) cannot be adapted in schools of Tomsk Oblast.

Thus, the study allowed uncovering the reasons for the insufficient application of network forms in education programs (specialized education in particular) and proved the objective need for Tomsk Oblast to develop the integration model that would ensure the necessary conditions for meeting the requirements of the Federal State Educational Standard of secondary general education, as well as maintain the level of funding for the general education system.

IV. MODEL CHARACTERISTICS

A. Conceptual framework of the Model

In the President’s message to the Federal Assembly of the Russian Federation of February 20, 2019, the guidelines for the further development of specialized education were defined. According to V.V. Putin, “companies and business communities will massively join projects such as the Ticket to the Future, which provide opportunities for schoolchildren starting from grade 6 not only to receive career support, but also to do internship in companies, scientific centres and other platforms” [2]. The same provisions are outlined in the main strategic documents [3], [4], [5].

The restrictions imposed by the Russian law regarding the “integration of educational and productive labour activities” in the early 90s, facilitated bringing the very concept of “labour training of school students” outside the major school activities and shifted the focus of the content of education from the “government order” to individual requests from students and their parents (legal representatives).

These days, the establishment of educational clusters is regulated at the federal level by the Order of the Ministry of Education and Science of the Russian Federation No. 611, dated July 23, 2013. This document endorses procedures for the establishment, development, and functioning of the innovative infrastructure in the education system of the region. At the level of a specific territory, it mainly implies programs of regional development that suggest creating clusters, with educational institutions being their parts.

The term “cluster” was introduced by M. Porter in the 1980s [6]. He defined a “cluster” as “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”. In Russia, cluster is usually understood as “a research and practical area associated with exploring and implementing new capabilities for society development, increasing its common welfare and enhancing competitiveness through cluster establishment and management” [7]. In the present article, the authors define a cluster as a community the activity of which is characterized by the following features: the availability of network forms of interaction between different educational institutions and their cooperation; the

density of educational institutions in the area; developed infrastructure in the area that ensures knowledge and technology exchange between cluster participants; and flexible structure of a cluster and its openness as a system.

The idea of education, science and industry integration is not new. In the Soviet era, there was a successful practice of industrial placement for schools; intra-school vocational training facilities were available. Nowadays, the accumulated experience is being revised in terms of present-day realities and conditions [8].

B. Identifying the necessary conditions for the implementation of the Model in Tomsk Oblast

The capacities of the educational system of Tomsk Oblast contribute to the establishment of educational clusters, which involve organizations from different fields of activity and creation of the conditions for pre-professional training. Tomsk Oblast has sufficient resources for creating educational clusters. During the period 2015-2010, six clusters were formed in the region: a nuclear technologies cluster, petrochemical cluster, timber industry cluster, renewable resources cluster, hard-to-extract resources cluster and “Smart Technologies Tomsk” innovative cluster. Currently, they all find themselves at different stages of development, but already have the necessary conditions to be included in the educational process of secondary school. However, the monitoring data on the organization of specialized education in 2020 have shown that there are very few individual cases of creating educational clusters around rural schools (individual educational institutions of Tomskiy, Pervomaiskiy, Kozhevnikovskiy districts) and several specialized educational institutions of the cities of Tomsk (e.g. Lyceum of Tomsk Polytechnic University and Lyceum of Tomsk State University) and Seversk.

In the course of project implementation, accessibility of important resources and the opportunities for exchanging scientific developments and hands-on experience are becoming increasingly important. In Tomsk Oblast, this function can be divided between the Tomsk Regional Institute for Advanced Training and Retraining of Educational Workers and Tomsk State Pedagogical University, since they are in charge of implementing professional training and retraining programs for teachers. Specialists from these organizations can work in the Centre of special competences of Tomsk Oblast (hereinafter referred to as the Centre), which can be established by the Department of general education of Tomsk Oblast. If so, the Tomsk Regional Institute for Advanced Training and Retraining of Educational Workers can become a suitable location for the Centre, because it is directly subordinate to the Department of general education of Tomsk Oblast.

C. Identifying the goals, objectives and expected results of Model implementation in Tomsk Oblast

The Model of the educational cluster can be made active use of when preparing:

- local regulatory documentation package for general education institutions, vocational education institutions and companies of Tomsk Oblast;
- methodological guidelines for managers of different organizations and institutions for the implementation of network forms of interaction in education;
- network educational programs for different students in any education form (including family education and self-education).

The purpose for developing the Model is to update the content and the model of the specialized education system within the region in the conditions of the introduction of the Federal State Educational Standard of secondary general education.

For this purpose to be achieved, the following tasks should be comprehensively addressed:

- creating the necessary regulatory, material, technical, information, methodological and personnel conditions for specialized education to be implemented;
- updating the content of specialized education and developing networking educational technologies;
- developing network inter-institutional interaction: school - university; school - vocational education institutions; school - university - company;
- creating specialized cluster classes (medical, aerospace, IT, agricultural, etc.), following the demand of the labour market in Tomsk Oblast;
- supporting and developing the activities of educational institutions aimed at the implementation of specialized training;
- advanced training for teachers to work in the conditions of specialized education and pre-professional training upon the introduction of the Federal State Educational Standard of secondary general education.

D. Identifying participants of the educational cluster of Tomsk Oblast

The following agents are expected to participate in Model implementation:

- Administration of Tomsk Oblast;

- Department of general education of Tomsk Oblast;
- Tomsk Regional Institute for Advanced Training and Retraining of Educational Workers;
- local public administrative authorities in charge of education;
- all educational institutions of Tomsk Oblast;
- educational institutions of supplementary education, developing not only artistic, social, and physical abilities of children, but also their skills and knowledge in engineering (including robotics) and natural science;
- educational institutions of secondary vocational and higher education;
- companies and business units of Tomsk Oblast interested in cooperating with educational institutions within specialized education.

Higher professional education can be represented by the universities of Tomsk Oblast.

E. The structure of the educational cluster based on the principle of distributed responsibilities of its participants

The key feature of the Model is its four essential components: resource integration, development management, education and information.

The Resource integration component implies coordination of activity by a working group of specialists from different departments and fields of activity. The objective of this component is to provide the necessary conditions for the implementation of continuous professional education within the “school – secondary vocational and (or) higher professional education institution – company” chain in Tomsk Oblast. This component addresses the following tasks:

- ensuring the necessary regulatory, material, technical, information and methodological conditions for the implementation of specialized education according to the cluster approach;
- providing the necessary conditions for network interaction within the “school - secondary vocational education institution – company” chain;
- establishing cluster classes, following the demand of the labour market and the directions of socio-economic development in a particular area.

The Development management component deals with the problems associated with multidisciplinary training in each municipal unit.

Its key focus is establishing network interschool cluster classes. Within the innovation platform entitled “The implementation of specialized general educational programs based on the cluster approach”, a network of local centres of cluster specialized education is being developed. They organize the system of network interaction between educational institutions and companies of the municipal entity and practically approve various technologies and network forms of the implementation of educational programs. These centres employ specialists from local public administrative authorities in charge of education, general educational institutions representatives (administration and teachers), specialists from industrial clusters and partner educational institutions (industry or company development managers). The essential conditions for this component include the following:

- implementation of network educational programs, social practices or research and design activities in mixed (interschool) classes or groups within the specialized education system;
- ensuring the conditions for the implementation of network specialized programs by applying e-learning tools in the specialized education system [9].

The Education component creates conditions for differentiation of the educational content for high school students and ample opportunities for designing individual educational trajectories. The tasks to be solved within the component include:

- developing facilities of specialized education in a particular area, providing in-depth study of subjects;
- developing network educational e-learning programs (including virtual laboratories, online courses, etc.);
- providing better opportunities for social involvement of students, including disabled and physically challenged students;
- updating the content of specialized education with the account of key subject competencies of students, based on network educational programs, social practices or research and design activities.

The theoretical part of the network specialized educational program is studied at individual educational institutions, whereas its practical part is implemented in a network industrial company. The necessary conditions of this component include:

- the availability of institutions and organizations in the educational cluster that will ensure the choice of specialization and training programs;

- student and teacher mobility in educational institutions of the cluster network;
- the possibility of granting credits on training courses and educational programs.

The Information component ensures providing the necessary information and personnel conditions for the implementation of specialized education upon the introduction of the Federal State Educational Standard of secondary general education in an individual region. This component deals with the following tasks:

- advanced training for teachers to work in the conditions of pre-professional training and specialized education upon the introduction of the Federal State Educational Standard of secondary general education;
- supporting and developing the activities of educational institutions aimed at the implementation of specialized education;
- training specialists of local public administrative authorities to interact with educational cluster participants;
- training specialists of the regional companies implement specialized programs within the educational cluster.

This work is performed at the Centre of special competences, which carries out training programs, seminars, workshops, conferences and other forms of advanced training and experience exchange for the educational cluster participants. Advanced training and retraining programs engage specialists from industrial clusters and partner educational institutions. Thus, the Centre establishes a network databank of syllabuses and programs for specializations, elective courses, internship, educational projects, methodological developments, etc.

In line with the objective of this component, all the collected information and developments are made accessible for cluster participants, including teachers of any schools in the region. Innovative platforms can also be organized within this component. The necessary conditions for this component are the following:

- providing scientific, methodological, information support and consulting to cluster participants for the implementation of network programs of specialized education;
- accumulating and sharing experience in specialized education;
- implementing advanced teacher training programs.

F. The regulatory support for the implementation of the Model

Establishing the legal and organizational framework for the interaction between participants and designing documentary were the essential condition for the implementation of the Model. The main documents to be followed included the “Procedure for the development and approval of internal policies and procedures” from the letter of the Ministry of Education and Science of the Russian Federation No. AK-2563/05, dated August 20, 2015 “On methodological recommendations” (together with “Methodological recommendations on organizing educational activities through network forms of educational programs”). Network forms of educational programs are regulated by contract agreement between network participants (Clause 15, the Federal Law No. 273 FZ, dated December 29, 2012 “On Education in the Russian Federation” (as amended in 403-FZ).

Educational institutions in the cluster carry out educational activity upon general education, supplementary education and pre-professional training programs. The activity of educational institutions is modified to suit government needs and meet the requests of students and their parents (legal representatives). The legal basis for this is Clause 44 of the Federal Law “On Education in the Russian Federation”, which establishes the right of a student and their parents (legal representatives) to participate in the management of educational institutions. School themselves draw up survey forms for grade 9 students and their parents on the choice of specialization and curriculum design [11].

V. PRACTICAL APPROVAL OF THE MODEL

The Model was thoroughly discussed by the pedagogical community of the region and became the basis for the development of the advanced training program for the management, methodologists and specialists of local public administrative authorities in charge of education (on the implementation of the Federal State Educational Standard of secondary general education in Tomsk Oblast, in particular). Not only did the participants of the training define the necessary conditions for the introduction of the cluster education Model and changes in the internal policies and procedures, but they also put forward suggestions concerning the organization of specialized education in rural schools. The discussion proved that the Model could as well be in demand by educational institutions in remote areas.

Since 2019, the Model has been implemented in Kolpashevskoye rural settlement in Tomsk Oblast within the framework of the activity of the federal innovation platform “Kolpashevskaya Secondary General School No. 2”.

The first year of platform operation produced the following results: for the 2020/2021 academic year, 4 specializations are organized for students of grade 10: technology group, natural science group, socio-economic group and individual curricula group (intended for those who have not decided on their professional preferences yet); contracts for the joint implementation of practical modules in specialized education programs have been signed up with three organizations that carry out pre-professional training programs; the necessary conditions have been ensured for granting credits on training courses and educational programs completed in other educational institutions (i.e. school students of the entire municipal area can study in specialized classes); 100% of the teachers implementing the Federal State Educational Standard of secondary general education, including the employees of partner institutions in Kolpashevskoye rural settlement have received training upon the implementation of the Model of the centre of cluster specialized education (at Kolpashevskaya Secondary General School No. 2). Online network programs for specialized level academic subjects are being introduced.

Preliminary results have indicated that the developed Model does, in fact, provide a differentiated approach based on a conscious choice of specialization and create the necessary conditions for ensuring the availability of specialized education, as each school student gets access to programs of basic and specialized levels in line with their interests and preferences with regard to professional education.

VI. CONCLUSION

From the administrative standpoint, due to the principle of activity integration the Model facilitates effective management by the general educational institution authorities:

- the Model is based on modern educational technologies and implies project-based learning, psychological support, professional trials, academic and research work, etc.;
- the Model solves the problem of organizing multidisciplinary education in rural schools of Tomsk Oblast and creating conditions for the Federal State Educational Standard of secondary general education to be implemented in remote and underfilled schools;
- the Model builds the system of specialized education on students' individual choices and guides them across studying in other educational institutions;
- the Model allows implementing a specialized educational program with no extra funding; it does not require additional material, software

and methodological support to organize high-quality education and training within the Federal State Educational Standard of secondary general education; it also develops students' individual research activity;

- the Model ensures continuity between general and vocational education; allows aggregating the efforts of teachers, parents, psychologists and other specialists in providing high-quality general education for students and their achievement of the expected results of mastering basic general and secondary general education programs;
- the Model can be applied to organize early specialized education for students.

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