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## Interaction between Enterprises of the Real Economy Sector of the Russian Arctic Zone and Educational Organizations (Using the Example of the Arkhangelsk Oblast): Content, Trends and Assessments

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**Abstract.** The team of authors of the article conducted a sociological study aimed at analyzing and assessing the interaction of enterprises in the real sector of the economy and organizations of higher and secondary education in the field of personnel training for the Arctic Zone of the Russian Federation using the example of the Arkhangelsk region. The results of the study allowed us to conclude that the growing shortage of specialists with higher and secondary vocational education in the shipbuilding, forestry and fishing industries of the Arkhangelsk region in recent years has stimulated the interest of enterprises in cooperation with educational organizations. The study revealed significant differences in the level of interaction by enterprise size. The most intensive cooperation between educational organizations is carried out with large enterprises planning staffing for the medium term, having the greatest personnel needs, as well as human and financial resources to build interaction in their interests. The study also showed a trend towards establishing long-term connections between educational organizations and large enterprises using a variety of cooperation tools and involving students in work activities during their studies with a view to subsequent employment. At the same time, quantitative and qualitative data indicate the vulnerable position of small and medium-sized enterprises in terms of cooperation with educational organizations and, as a consequence, the provision of personnel. This is due both to the limited human resource for planning personnel policy, and to the fact that the few educational organizations in the region, as a rule, give priority to cooperation with major players, due to their status and ability to provide material support to the educational institution.

**Keywords:** *staffing, labor market, shipbuilding industry, forestry industry, fishing industry, Arctic zone of the Russian Federation, Arctic, employers, educational organizations, practical training*

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### *Introduction*

Intensifying cooperation between enterprises and educational organizations of higher and secondary vocational education is one of the main trends in the development of both the education system and the socio-economic development of the region or a subject of the Russian Federation [1, Kudryashova E.V., Sorokin S.E., Bugaenko O.D.]. The educational, scientific and technological policy of Russia is being formed from the standpoint of the need for close interaction between the personnel training system, real economy and the social sphere<sup>1</sup>. The key challenges in the field of personnel training, which determine the relevance of this problem, are, firstly, the shortage of graduates of engineering, pedagogical and medical specialties; secondly, the insufficient skills quality of graduates and their adaptability to the employer's requirements. In this regard, in recent years the range of various forms and mechanisms of interaction between employers and educational organizations has expanded significantly [2, Balatskiy E.V., pp. 58–75].

The relevance of this problem for the Arctic zone of the Russian Federation (the Russian Arctic) is due to the fact that the above challenges, as well as transformations in the labor market associated with the demographic situation, the development of the digital economy and the sanctions regime of Western countries, have a particularly strong impact on the Arctic regions with their traditionally high level of migration, population outflow and economic dependence on conditions in commodity markets. The "Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035" highlights the discrepancy between the system of secondary vocational and higher education in the Arctic zone and the requirements of the economy and social sphere of qualified and highly qualified personnel as a risk for the development of the Russian Arctic<sup>2</sup>.

Researchers note that the regions of the Russian Arctic are characterized by an increase in personnel shortages and insufficient training of specialists in the Arctic territories [3, Efimov I.P., pp. 118–132]. Scientific research also substantiates the fact that the higher education system is insufficiently focused on priority areas of the Russian Arctic development, which require specific human resources [4, Sigova S.V., Stepus I.S.].

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<sup>1</sup> Ukaz Prezidenta Rossiyskoy Federatsii ot 01.12.2016 № 642 «O Strategii nauchno-tehnologicheskogo razvitiya Rossiyskoy Federatsii» [Decree of the President of the Russian Federation dated December 1, 2016 No. 642 "On the Strategy for Scientific and Technological Development of the Russian Federation"]. URL: <http://kremlin.ru/acts/bank/41449> (accessed 09 August 2023).

<sup>2</sup> Ukaz Prezidenta Rossiyskoy Federatsii ot 26.10.2020 № 645 «O Strategii razvitiya Arkticheskoy zony Rossiyskoy Federatsii i obespecheniya natsional'noy bezopasnosti na period do 2035 goda» [Decree of the President of the Russian Federation dated October 26, 2020 No. 645 "Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035"]. URL: <http://www.kremlin.ru/acts/bank/45972> (accessed 09 August 2023).

### *Research review*

The interaction of professional educational organizations with enterprises in various sectors of economy is a topic in demand for study. Monitoring studies [5, Shugal N.B., Kuznetsova L.B., p. 72] are carried out, interdisciplinary comprehensive scientific projects are implemented, trends and models of interaction are conceptualized through the lens of interdisciplinary positions [6, Fleck M.B., pp. 154–171].

Part of the long-term project “Monitoring the Economics of Education”, carried out since 2002 by HSE University, is the collection of data and analysis of the interaction between the education system and employers, mainly using the example of secondary vocational education (SVE) [7, Shuklina E.A., pp. 86–99]. One of the latest statistical reviews takes into account such important forms of interaction as professional and public accreditation, practical training at enterprises, participation in professional skills championships according to WorldSkills standards, and the presence of experienced teachers in the manufacturing sector [5, Shugal N.B., Kuznetsova L.B., p. 72].

In 2021, the authors Blinov V.I., Satdykov A.I. and Siliverstova I.V., based on the research, described the current state of interaction between professional educational organizations and enterprises in 29 constituent entities of the Russian Federation, including those related to the Russian Arctic. The authors come to the conclusion that traditional forms of interaction (practical training) are most widespread and there are no tools for partnership institutionalization [8, pp. 41–70].

A team of scientists from the Ural Federal University conducted a study to evaluate the practices of interaction between leading universities and enterprises that were drivers of the regional economy [7, Shuklina E.A., pp. 86–99]. The researchers considered a wide range of issues of interaction, including efficiency in such aspects as replenishment of staff, creating an innovative environment, the social development of territories, and enterprise management. The authors come to the conclusion that simplified forms of interaction between universities and enterprises prevail, which is to a certain extent explained by the lack of desire of employers for long-term and innovative forms of cooperation, which, in turn, is due to the “features of the labor market, the “overproduction” of personnel by universities, excessively replenishing the professional region structure” [7, Shuklina E.A.].

In 2022, a team of scientists from the Plekhanov Russian University of Economics, as part of monitoring studies, prepared a report on trends in the development of education in the world and in Russia, including the interaction of universities with industrial partners. The authors named strengthening cooperation with industry as one of the main trends in the development of higher education. The report provides a classification of models, levels and areas of interaction<sup>3</sup>. The re-

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<sup>3</sup> Vzaimodeystvie vuzov s industrial'nymi partnerami. Rezul'taty monitoringa informatsii o tendentsiyakh razvitiya vysshego obrazovaniya v mire i v Rossii [Interaction of universities with industrial partners. Results of monitoring in-

port discusses scientific, technological and innovation partnerships in conjunction with personnel training. The authors provide a detailed overview of rating measurements of interaction processes, the methodology of which contains criteria for the participation of employers in personnel training<sup>4</sup>.

The works of T.A. Grosheva [9, pp. 165–172], E.V. Kudryashova [1], E.Ya. Kogan [10], M.B. Fleck [6] are devoted to the issues of conceptualization of this topic. A team of scientists under the authority of E.V. Kudryashova considers the process of interaction between universities and the production sector in the context of the implementation of the “third mission”. The authors highlight key areas of cooperation, which include various forms of enterprise participation in educational activities [1]. It is noted that the most important aspect of interaction is the process of building joint long-term strategies with universities, planning personnel needs and determining the set of competencies of future young specialists [1].

The works of F.F. Dudyrev [11], A.Yu. Petrov [12], T.V. Fedosova [13], G.S. Siraya [14] and others are devoted to certain aspects of interaction between educational organizations and enterprises.

Issues of interaction between educational organizations and enterprises in the Arctic zone of the Russian Federation are also the focus of attention of the scientific community. Researchers raise questions about the system of interaction between Arctic universities and individual enterprises in the region as part of the implementation of educational projects<sup>5</sup>. A methodology for assessing the consistency of regional vocational education systems with the demands of the labor market and, as a result, forecasting the personnel needs of enterprises in the Russian Arctic are being developed and tested [15, Stepus I.S., pp. 594–612].

Today, despite the great attention to the issues of interaction between employers and educational organizations, there is no relevant quantitative and qualitative empirical data on the identified issues in relation to the Arctic region. In addition, previous studies poorly take into account the specifics of staffing and regional labor markets in the context of individual industries.

### ***Research methodology***

The collection of empirical data for the study was carried out using sociological tools. In 2022, the Institute for Strategic Development of the Arctic (Northern (Arctic) Federal University named after M.V. Lomonosov – NARFU) undertook a sociological study on the topic “Staffing of the shipbuilding, forestry and fishing industries of the Arkhangelsk region in the context of digitalization” [16, Saburov A.A., Minchuk O.V., Nikiforov A.S., pp. 211–233]

Primary data collection was carried out using questionnaires and in-depth interviews.

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formation on trends in the development of higher education in the world and in Russia]. Moscow, Federal State Budgetary Educational Institution of Higher Education “Plekhanov RUE”, 2022, 132 p.

<sup>4</sup> Ibid.

<sup>5</sup> Arktika — natsional'nyy megaproekt: kadrovoe obespechenie i nauchnoe soprovozhdenie [The Arctic is a national megaproject: staffing and scientific support], Arkhangelsk, NARFU Publ., 2016, 264 p.

The survey was conducted between August 3 and September 6, 2022 using the LimeSurvey Internet platform. The general population of the study included enterprises of the shipbuilding, forestry and fishing industries of the Arkhangelsk region, taking into account the main and additional types of economic activities in accordance with the All-Russian Classifier of Types of Economic Activities (Table 1) [16, Saburov A.A., Minchuk O.V., Nikiforov A.S., pp. 211–233].

Table 1

*Types of economic activity by economic sector*

Economic sector	Types of economic activities
Forestry industry	02 Forestry and logging 16 Manufacture of wood and products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials
Fishing industry	03 Fisheries and fish farming 10.2 Processing and preserving of fish, crustaceans and molluscs
Shipbuilding industry	25.99.26 Production of ship propellers and paddle wheels 30.1 Construction of ships, vessels and boats 33.15 Repair and maintenance of ships and boats

The total population of the study consisted of 90 legal entities of various organizational and legal forms. The sampling population consisted of 50 legal entities.

All industries were represented in the sampling population: fishing, shipbuilding, forestry. The survey covered large (46%), as well as medium and small (54%) industrial enterprises [16, pp. 211–233].

40% of fishing enterprises, 64% of forestry enterprises, and 44% of shipbuilding enterprises completed a survey from the total population of legal entities in each of the industries under consideration. In the forestry industry, 36 enterprises were surveyed, having more than 54% of the employees of the entire industry in the region; in the fishing industry – 10 enterprises, employing more than 54%; in the shipbuilding industry – 4 enterprises, having 93% of employees [16, pp. 211–233].

The questionnaire included 36 questions, divided into three main blocks:

- forecasting personnel needs;
- demanded competencies and satisfaction with the level of training of graduates;
- interaction with educational organizations.

Questions related to the discussed topic in the article were included in the third block [16, p. 211–233].

As part of the study, the following indicators were determined and analyzed:

- the presence of interaction;
- forms of interaction;
- interaction factors;
- consequences of interaction;
- general assessment of interaction;
- assessing the effectiveness of implemented forms of interaction;

- assessment of the effectiveness of communication channels.

From November 2022 to July 2023, a survey of enterprises from the selected sample was conducted using semi-structured interviews. 23 employer representatives were interviewed. The informants were mainly managers, deputy HR & administration directors, HR executives and other structural divisions of enterprises, as well as experts from the field of education.

The interview guide included three sets of questions. The first block of questions concerned the problems of staffing of enterprises. The second block was aimed at identifying the attitude of informants to the level of training of graduates of educational organizations. The third block of questions was devoted to the processes of interaction between employers and educational organizations.

### **Research results**

Empirical evidence shows high interest among enterprises in collaborating with universities and colleges. 61.9% of employers who took part in the study would like to begin or resume various types of interaction with educational institutions of higher and secondary vocational education.

Many informants drew attention to the fact that more and more employers understood the impossibility of getting a ready-made graduate “here and now” and were increasingly turning to educational institutions with the initiative of comprehensive long-term cooperation.

*“Enterprises understand that they need to take care of their staff. Repurchasing is expensive, that is, people have to pay more, so in this case it is not always effective. It’s better to do it differently, it’s better to attach people in the finest sense of this word, to connect their lives with the life of the enterprise. Therefore, the first thing that enterprises do is to place an order. This trend already started a year or two ago”* (informant No. 22, expert, shipbuilding industry).

*“When a general director of the large enterprise decided on the main development milestones, he came to the conclusion to play the long game. We established a special scholarship program for students... .. plus, we were integrated not only into scholarships, but into the competitive process, when the enterprise is integrated into the formulating of topics of students’ projects and the research development stage, and the defense stage. ...This vocational-oriented approach of early meeting with the university is tailored to the request of the enterprise”* (informant No. 5, representative of an educational organization, graduate employability manager).

During the interview, cases of recent initiation of complex cooperation with the university by the enterprise were also recorded: *“... our employer (a large enterprise in the fishing industry) has better finances, they are now (at the university) designing premises with their own symbols, placing stands. We will have fish in one of the rooms on the 5th floor, and they will donate fish for our pools. .... They are ready to involve personnel, conduct classes in a number of disciplines, or involve their partners in these classes... They have already trained for free a number of employees of the university under the professional retraining aquaculture program”* (informant No. 3, representative of an educational organization, fishing industry).

Moreover, competition for future qualified workers encourages large enterprises to work with schools to conduct career guidance counseling and prepare for the Unified State Exam in principal subjects.

*“For four years now we have been conducting one of the career guidance projects at our enterprise. We are looking for teachers in mathematics, physics and computer science and we are “educating” tenth graders at our base... We pay teachers for their work; the pupils go there for free ... so that they ... come to us for technical training”* (informant No. 10, a large enterprise, ship-building industry).

*“We hold general meetings in schools in the districts. .... We gather the children and explain who we are, what we are, and we do this in conjunction with the Higher Engineering School (university), that is, we travel together... And there are some different activities for children: quests, games, and other events”* (informant No. 12, large enterprise, forestry industry).

According to employers in the Arkhangelsk region, interaction with educational organizations brings the greatest benefit to providing their enterprise with personnel (the average rating is 4.1 on a 5-point scale, where 1 is the least benefit, 5 is the greatest benefit). Significant, but secondary goals that are achieved during cooperation are: creating a positive image and increasing reputation (average score – 3.8), solving production problems (average score – 3.6), implementing the social responsibility of the enterprise, overall contribution to the region development and education system (average score – 3.3), fulfillment of external obligations to the state or founders (average score – 3.1). The significance of such cooperation, primarily for solving the personnel problems of enterprises, is confirmed by the fact that 90.5% of surveyed employers have hired graduates with whom interaction was carried out over the past three years (Fig. 1).

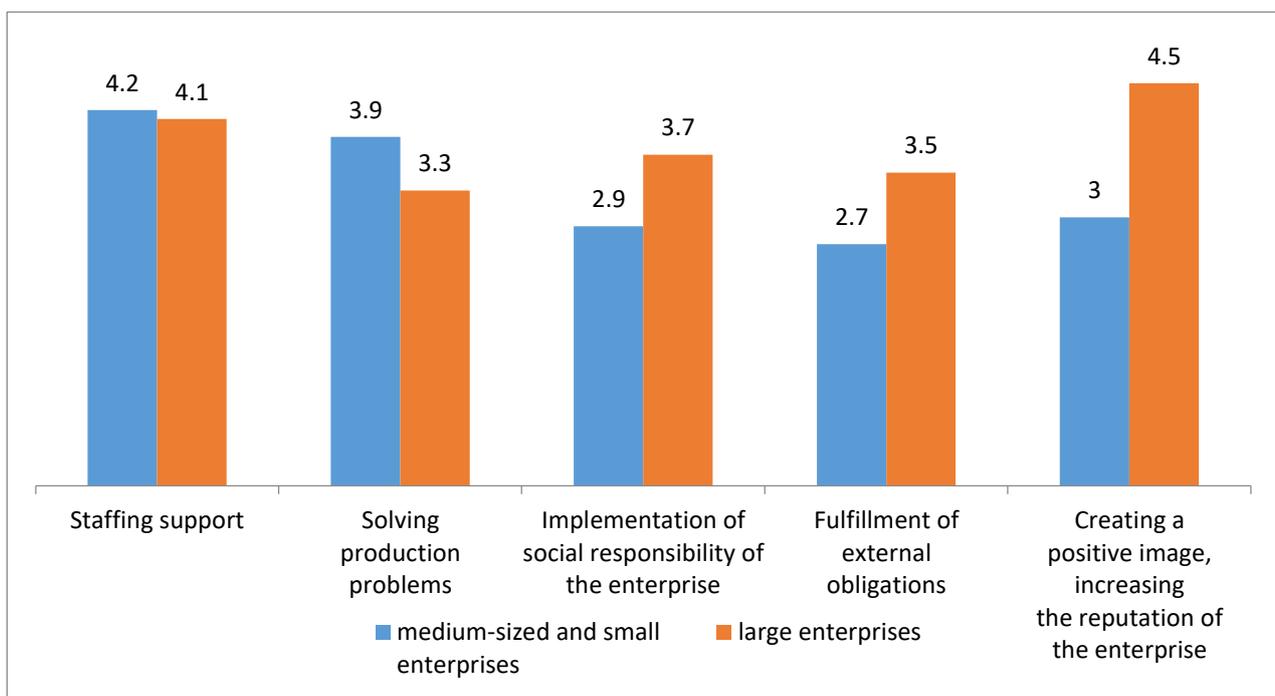


Fig. 1. Average score of enterprises' assessment of the benefits of interaction with educational organizations, from 1 – least benefit to 5 – greatest benefit (%).

The number of partners from educational organizations varies significantly for enterprises depending on their size. Informants - representatives of small and medium-sized enterprises more often mentioned 1–2 educational institutions as regular partners. In turn, the region's largest employers interact with dozens of universities and colleges.

*“The spectrum is quite wide. If we take universities that are not located in the Arkhangelsk region, it is somewhere around 29 today or 30, I don't remember. That is a fairly wide range, starting from Sevastopol, Novocherkassk and Rostov-on-Don. Plus all urban institutions of secondary vocational education, plus half of them in Arkhangelsk, probably”* (informant No. 9, large enterprise, shipbuilding industry).

*“We have expanded the geography of interaction with educational institutions; that is, now about 35 cooperation agreements have been concluded with 35 institutions across the country in the required areas of training for our enterprise”* (informant No. 10, large enterprise, shipbuilding industry).

Analysis of quantitative data showed that enterprises use all the proposed methods of interaction with educational organizations of higher education and secondary vocational education. However, the level of interaction between enterprises and secondary vocational education organizations is somewhat lower than with higher education organizations. On average, for each form of interaction, 4.8% of employers cooperate with educational institutions. The only significant exception is the conclusion of an agreement on targeted training: this form of interaction is much more often practiced by enterprises with SVE than with HE (57.1% versus 33.3%).

Table 2

*Prevalence and assessment of forms of interaction between employers and HE and SVE organizations*

Form of interaction between employers and educational organizations	Employers' assessment of the effectiveness of the form of interaction, average score on a scale from 1 to 5		Share of employers using this form of interaction with educational organizations, %	
	HE	SVE	HE	SVE
Advanced training courses for employees of the enterprise, implementation of professional retraining in these educational organizations	3.90	3.38	95.2	61.9
Organization of practical training / internships for students	3.65	3.89	81	85.7
Participation of an enterprise representative in the management of an educational organization (membership in the supervisory or trustee board of an educational organization)	3.57	2.67	33.3	28.6
Participation of enterprise representatives in the educational process (teaching, conducting practical classes, scientific guidance on writing final qualification papers) of these educational organizations	3.44	3.20	42.9	47.6



Participation of an enterprise representative in the development / examination of educational standards / educational programs / modules / practice programs of these educational organizations	3.44	3.00	42.9	42.9
Partnership and (or) sponsorship of specialized competitions, Olympiads, etc.	3.38	3.00	38.1	42.9
Participation in other events (scientific conferences, round tables, public hearings, projects, etc.) organized jointly with (or) these educational organizations	3.36	3.18	66.7	52.4
Participation in career guidance events (career fairs, admissions events, etc.) organized jointly with (or) these educational organizations	3.33	3.75	71.4	57.1
Implementation of a network educational program, including a mentoring institute at the enterprise	3.20	3.43	47.6	33.3
Participation of an enterprise representative in the state final certification (as a member or chairman of the commission)	3.18	3.30	52.4	47.6
Enterprise scholarship programs (cash payments to students who excelled in their studying in specialized areas)	3.13	3.13	38.1	38.1
Functioning of the basic department of an educational organization	3.13	2.40	38.1	23.8
Interaction with educational organizations through the participation of an enterprise representative in councils and other advisory structures under government bodies (regional and local) involved in the implementation of educational policy	3.11	3.14	42.9	33.3
Concluding an agreement on targeted training	3.08	3.60	57.1	47.6
Organization of training and internships for teaching staff / teachers of educational organizations at an enterprise	2.90	2.80	47.6	47.6
Financial and resource support for the educational activities of these organizations (sponsorship, arrangement of educational laboratories, purchase of educational equipment, etc.)	2.43	3.25	33.3	57.1
Participation in public accreditation of these educational organizations	2.00	2.40	23.8	23.8

In cooperation with HE organizations, employers most often come to such forms of interaction as the completion of advanced training courses for employees of the enterprise and professional retraining in educational organizations (95.2%); organizing practical training / internships for students (81%); participation in career guidance events (career fairs, admissions events, etc.) organized jointly with (or) educational organizations (71.4%). These forms of cooperation are used by more than 70% of all surveyed organizations.

In cooperation with vocational education organizations, employers most often use such forms of interaction as organizing practical training / internships for students (85.7%), taking advanced training courses for employees of the enterprise, carrying out professional retraining in educational organizations (61.9%), and participating in career guidance events organized jointly with (or) these educational organizations (57.1%).

The average score for assessing the effectiveness of all forms of interaction with HE and SVE organizations by employers is almost identical – 3.19 and 3.15 points, respectively. The presented data is visualized in Figure 2.

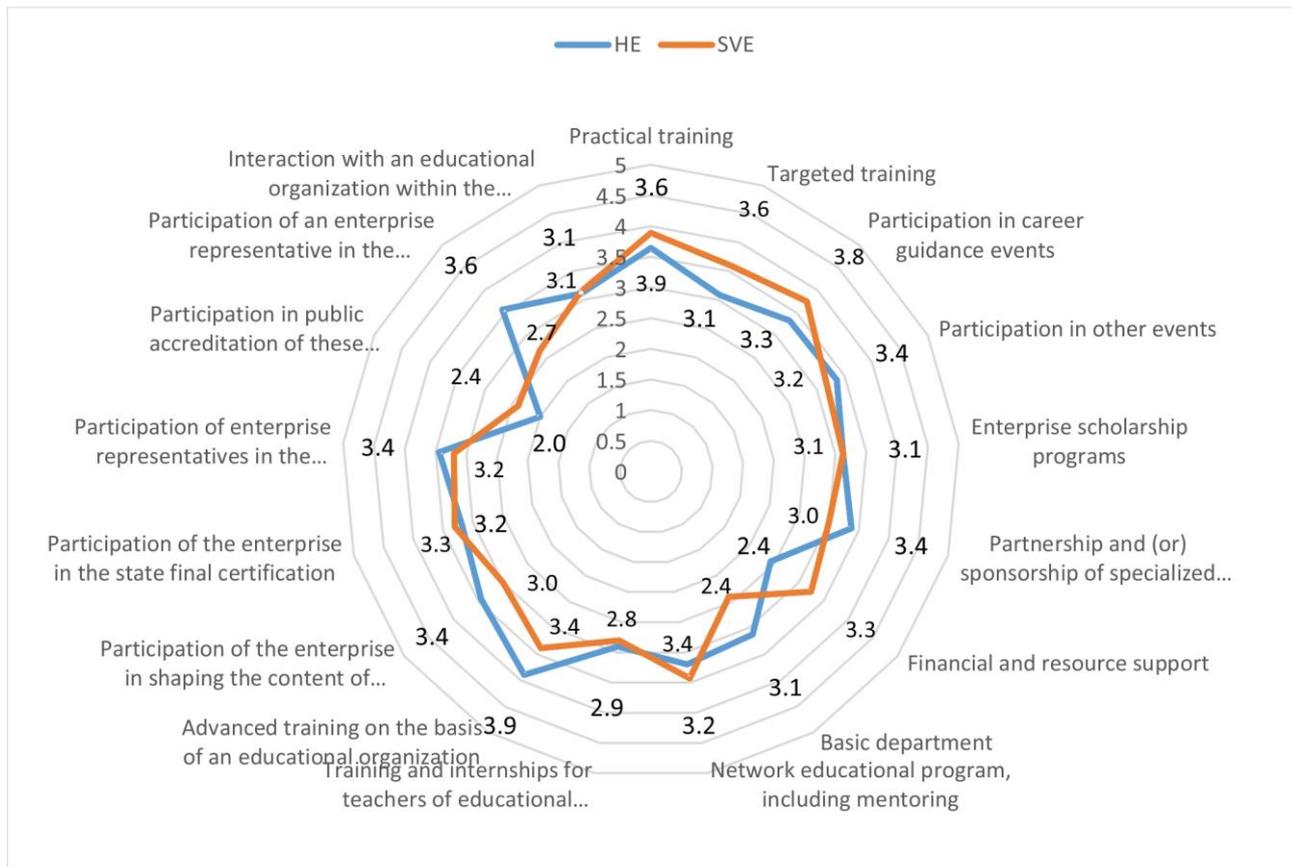


Fig. 2. Assessment of the effectiveness of forms of interaction with educational organizations (HE and SVE) of enterprise representatives.

Common forms of cooperation with HE organizations – the completion of advanced training courses for employees of the enterprise and the organization of practical training / internships for students – are recognized by employers as the most effective (average rating – 3.90 and 3.65 points, respectively). With regard to interaction with vocational education organizations, employers highly rate the effectiveness of the organization of internships / internships for students (3.89 average score) and career guidance activities (3.75 average score).

At the same time, the frequency of use of interaction forms does not always correspond to the assessment of their effectiveness. In particular, forms of cooperation that are highly rated as effective are participation in the management of an educational organization (average score 3.56 points), participation of an enterprise representative in the development / examination of educa-

tional standards / educational programs / modules / practice programs of these educational organizations (3.44 points), participation of enterprise representatives in the educational process of these educational organizations (3.44 points) is practiced by less than half of the surveyed enterprises. The effectiveness of the employer's direct participation in the educational process is repeatedly emphasized by informants.

*“This year we actively began working with our 28th technical school in this direction. For example, we made our own adjustments and comments to the curriculum for certain professions. For example, for the training of welders we developed a program of additional practical internships for teachers of craftsmen and educational institutions, so that they would teach children exactly the equipment and skills that they will see at the enterprise”* (informant No. 10, a large enterprise in the shipbuilding industry).

*“This year we have project activities with forest engineers, that is, we gave them a direct project, a task, they carried it out, went to our plots, watched the technological process, and interacted with our employees. And in principle, they have already prepared a project, they will present it to us, and we will select the best students and somehow try to keep them close to us”* (informant No. 12, large enterprise, forestry industry).

The study revealed an uncharacteristic case of the initiation and implementation of educational products for teachers of educational organizations by an enterprise. Moreover, this practice was highly appreciated both by the enterprises and by universities and colleges. *“Two years ago, we did such a project with educational institutions: for teachers of “Aquatic Bioresources and Aquaculture” we created a course of online lectures, where specialists from our company spoke, plus we invited quite professional foreign and domestic experts. It was an intensive course of online lectures for a month. After that, we brought them to our sites in Murmansk, showed how it looked in reality, and with this message they went to their universities. ... After this, firstly, our recognition in specialized institutes increased greatly, and secondly, a queue for internships was immediately organized...”* (informant No. 16, large enterprise, fishing industry).

One of the major obstacles to the flow of teachers from industry into education is the uncompetitive salaries.

*“... it is clear that those who go to sea... earn not the same money as what people earn on the shore... Therefore, it is difficult with personnel, I mean with personnel from the industry, and here personnel are needed from the industry”* (informant no. 3, representative of an educational organization, fishing industry).

Survey data show that the most common and effective format of interaction is the organization of student internships, which consists of performing certain types of work related to future professional activities<sup>6</sup>, by students, as a rule, in real production conditions. For employers, this is

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<sup>6</sup> Prikaz ot 5 avgusta 2020 goda N 885/390 «O prakticheskoy podgotovke obuchayushchikhsya» (s izmeneniyami na 18 noyabrya 2020 goda) [Order of August 5, 2020 N 885/390 “On practical training of students” (as amended on November 18, 2020)]. URL: <https://docs.cntd.ru/document/565697405> (accessed 30 October 2023).

one way to conduct early professional selection. Thus, one of the representatives of the fishing industry enterprise noted: *“We expect that after the internship a certain number of people will stay or return after training, depending on the course. Someone is already expressing a desire to work in the company, to continue graduate work for our own benefit”* (informant No. 16, large enterprise, fishing industry).

The effectiveness and relevance of this form is indirectly confirmed by data on the willingness to organize salaried placement. Thus, 47.6% of employers noted that such experience was being implemented at their enterprises; another 28.5% indicated that there was a readiness for this, but the presence of financial or administrative barriers did not allow it. And only 23.8% of employers are generally not interested in salaried placement.

The “Plant – technical college” system is recognized by both employers and educational organizations as one of the most successful practice-oriented training. Existing since 1965, it provides continuous multi-level engineering and technical education for specialists from shipbuilding and ship repair enterprises in Severodvinsk. Students studying under the “Plant – technical college” system are full-time students, but during their studies they work at these enterprises from the Freshman semester. *“If it’s “Plant – technical college”, it’s a 100% ready-made specialist in all characteristics. Why? Because we do the internship ourselves... they’ve been working at our plant for about three semesters”* (informant No. 10, large enterprise, shipbuilding industry).

The general assessment of satisfaction of enterprises with interaction with educational organizations of the Arkhangelsk region can be characterized as average and conservative. 52.4% of employers are satisfied with the interaction, including 19% who are completely satisfied. A third of respondents found it difficult to give a general assessment. The average satisfaction score was 3.62 out of 5. Noteworthy is the fact that 60% of medium and small enterprises, mainly representatives of the forestry industry, found it difficult to answer the question about satisfaction with interaction, which is probably an indirect indicator of the limited cooperation with educational organizations (Fig. 3).

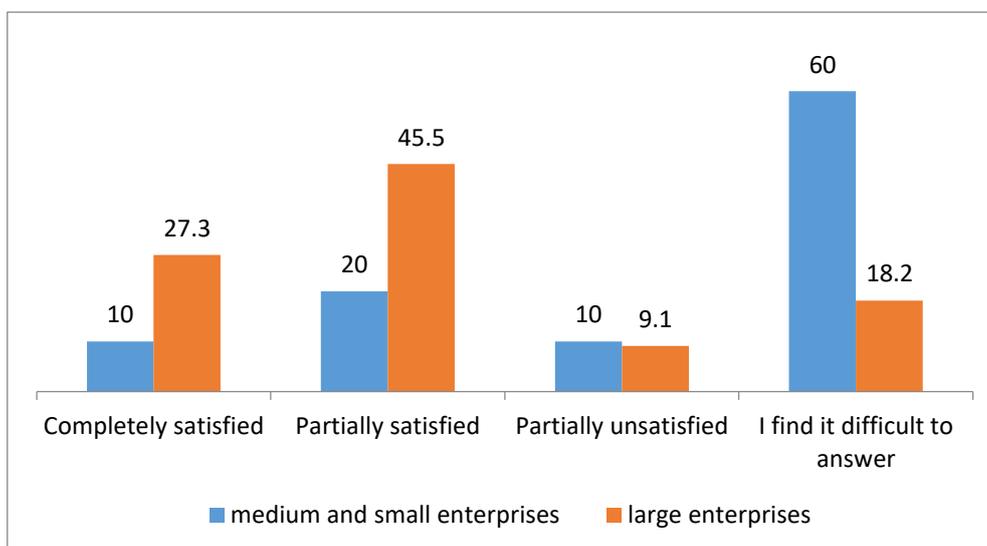


Fig. 3. Satisfaction of the enterprise with the level of interaction with educational organizations.

Among the obstacles to the development of cooperation, the greatest weight, according to employers, is the disinterest of educational organizations (38.1%); the costs and efforts of the enterprise to organize cooperation do not justify the obtained results (33.3%); lack of understanding of educational organizations of the subject of cooperation (33.3%).

On the part of large enterprises, the most significant problem was the disinterest of educational organizations and the unjustifiability of the efforts invested in cooperation. This point of view is expressed to a greater extent by representatives of the shipbuilding and forestry industries. Informants also mentioned difficulties of an organizational nature: *"We quite often encounter not a problem, but a condition that is not very comfortable for us, when an educational organization sends us ... a schedule of practices almost the day before, I say exaggeratedly. And in order to organize an internship, we need to go through some certain formal things, including organizing access control"* (informant No. 9, large enterprise, shipbuilding industry).

Informants-employers also mentioned the fact that an obstacle to cooperation between educational organizations is their outdated material and technical base.

*"We have been cooperating with the technical school ... for three years in the framework of training of forestry machine operators ... But the technical equipment there leaves much to be desired. After all, they are machinists, they have expensive equipment, and expensive simulators; in general, this issue is being resolved for now"* (informant No. 12, large enterprise, forestry industry). Further, the informant expressed the hope that modern equipment for this technical school could be purchased within the framework of the "Professionality" program.

*"Now we have new fishing vessels; two of them are already in the fishery. They have the most modern equipment. The university simply does not have the training facilities to match these vessels. Therefore, we still have to train on the job"* (informant No. 13, large enterprise, fishing industry)

There is uncertainty about the interest of educational organizations in interaction with medium and small enterprises. In interviews, many representatives of SMEs spoke about difficulties in dialogue with educational organizations.

*"The problem is that educational organizations are not particularly looking for connections with us. We interact with the college; they give us students for practice. We have an agreement, for example, with the school in Kotlas. We interact and work with them. But we suffer a shortage of painters. I couldn't find any college to conclude an agreement. What amazes me more is that the educational institutions are not interested in concluding any agreements with the enterprise for the same practice"* (informant No. 2, representative of SMEs in the shipbuilding industry).

SME employers are also not always informed about the possibilities of reaching out to students potentially interested in working. *"It's just that in reality I'm not even given the opportunity to talk and make suggestions to students... There's not even a notice board or an admissions events where a potential employer can introduce himself"* (informant No. 2, representative of SMEs in the shipbuilding industry).

Another challenge for small and medium-sized enterprises, especially in the shipbuilding industry, is the high competition of the largest employers for personnel and, accordingly, for cooperation with educational organizations: *“I tried to hire specialists who could make small-scale ship drawings, I needed a young specialist. I called the university manager, and I said to the director, “Can I hire some student to work?” The first thing he said was that all of them intended to work at large enterprises. And secondly, he gave me the phone number of the teacher who was responsible for their practice, and their placement. I dialed a number and had the design office on the phone. This teacher managed a design drawing bureau at the same time, and all those students worked there”* (informant No. 2, representative of SMEs in the shipbuilding industry).

An important advantage of large employers in building profitable cooperation with educational organizations is the opportunity to sponsor and improve the material and technical base of educational organizations and develop educational products.

*“If you have been to Severodvinsk, there is a building that is well equipped for all our professional directions. And we should say a big thank to the plants, because much equipment was purchased as their sponsorship”* (informant No. 6, representative of the management of an educational organization).

At the same time, representatives of educational institutions noted that there is an unpreparedness of some employers to work together on the content of education: *“Everyone says that educational institutions do not teach what employers need. That is, a person comes to the plant and learns again how to work... But there are no initiatives to do something... even to get involved in the plans...”* (informant No. 3, representative of an educational organization, fishing industry).

In addition, some employers still expect to receive instantly a ready-made specialist in accordance with rapidly changing personnel needs.

*“Now they have a colossal demand for import substitution. “That is, give us those who will be innovators. Give us those who will improvise.” But this is creative thinking. Initially, do you need a functionary to ensure the operation of the equipment, or do you need Kulibin, who will create something from this? But they are not born out of the blue; this is a different type of thinking”* (informant No. 5, representative of an educational organization, graduate employability manager).

*“A representative of an employer in the timber industry came not long ago... “We are ready to hire your graduates”. And I say: “But they don’t exist. I have eight graduating cellulose workers this year; they are all already employed... In order for you to get a technologist now, you need to find him at school, send him to us to get employer-sponsored education, we will teach him, and you will get him”* (Informant No. 6, representative of the management of an educational organization).

*“Not so long ago at one forest industry enterprise I was invited to a working meeting regarding the training of specialists, and one of the managers said: “I now need a driver, a site foreman and someone else”. “Do you need it now? And tomorrow, and in 5 years? Do you have any vision?”* (Informant No. 11, employee of the university department).

Representatives of enterprises noted factors that could expand opportunities for cooperation with educational organizations:

- availability of state support measures for effective interaction with educational institutions (benefits, compensation, etc.), 61.9%;
- high level of student training, allowing to be involved in the production process without lengthy adaptation and retraining, 52.4%;
- manifestation of interested activity on the part of educational institutions, 38.1%.

Large and medium and small enterprises generally did not show significant differences in determining the factors mentioned above. A higher level of student training could greatly contribute to the expansion of cooperation with educational organizations specifically for the fishing and shipbuilding industries.

Analysis of the interviews shows that one of the key factors for successful cooperation between an employer and an educational organization is a regular dialogue, when a mutual understanding of needs, opportunities and limitations is achieved. *“This was actually a very difficult process for the simple reason that we even had a misunderstanding. That is, what we say, how we verbalize competencies and how the employer understands them are very different stories... Shipbuilding enterprises have become accustomed to our approach over many years. And we are. And there we have fewer contradictions. ... There’s been quite a long history with the timber industry, and it’s even gotten to the point where I’m a member of the council for the development of qualifications in the timber industry now. They deliberately introduced me into so that industrialists could understand a little how personnel were trained”* (informant No. 6, representative of the management of an educational organization).

During the dialogue, many informants emphasized the importance of established personal relationships for maintaining quality interaction.

*“We have a practical training specialist. ... He has been working for a long time, he has a lot of acquaintances in personnel services, which are shipowners, fishermen or crewing companies... The time comes and he approximately knows who and where to get a job based on the level of grades, knowledge, according to reviews of teachers, by behavior...”* (informant No. 3, representative of an educational organization, fishing industry).

*“In the case of informal connections, these relationships are maintained due to favorable relationships between teachers and students during training, which subsequently influences the further maintenance of these acquaintances, assistance and cooperation. In addition, students and teachers often work in the forestry industry, and children of forestry workers study”* (Informant No. 15, SME, forestry industry).

### Conclusion

The results of the study showed that in recent years the growing shortage of specialists with higher and secondary vocational education in the shipbuilding, forestry and fishing industries

of the Arkhangelsk region has stimulated the interest of enterprises in cooperation with educational organizations. The processes of interaction between enterprises and educational organizations in the Arkhangelsk region are currently undergoing a period of active development, which is confirmed both by the variety of forms of interaction and the intensification of their use, and by the subjective assessment identified from the results of the survey and interviews.

The study revealed significant differences in the level of interaction by enterprise size. The most intensive cooperation between educational organizations is carried out with large enterprises planning staffing for the medium term, having the greatest personnel needs, as well as human and financial resources to build interaction in their interests. The study also showed a tendency to establish long-term connections between educational organizations and large enterprises using a variety of cooperation tools (practical training, participation in the planning and implementation of the educational process, competitions, scholarships, purchase of educational equipment, etc.) and involving students in work activities during their studies for the purpose of subsequent employment. In addition, for the purpose of long-term staffing, large companies work with schools in the region, thus providing vocational guidance at an early stage.

Quantitative and qualitative data indicate the vulnerable position of small and medium-sized enterprises in terms of cooperation with educational organizations and, as a consequence, the provision of personnel. This is probably due both to the limited human resource for planning personnel policy, and to the fact that the few educational organizations in the region, as a rule, give priority to cooperation with major players, due to their status and ability to provide material support to the educational institution. This explains the relatively low participation of SMEs in the development of educational products and direct teaching and, in general, a lower level of awareness about the possibilities of cooperation with educational organizations.

For the sustainability of staffing in key industries in the region, taking into account the challenges identified as a result of the study for the interaction of enterprises with educational organizations, the following measures seem appropriate:

1. Development by government authorities of sectoral institutional mechanisms (for example, in the form of advisory bodies) to ensure regular dialogue between representatives of employers and educational organizations on issues of personnel training, information about cooperation opportunities, and replication of best cooperation practices.

2. Development of public-private partnership mechanisms, including the federal project "Professionalism" to provide a modern material and technical base for educational organizations, including training equipment.

3. Financing by government bodies of educational programs of additional education (including professional retraining and vocational training programs) with the participation of employers and educational organizations in in-demand specialties.



4. Ensuring remuneration for the teaching staff of educational organizations at a competitive level for the wider involvement of practicing specialists in the educational process and ensuring a high level of teaching.

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