

Evaluation of Professional Education in Western Yakutia

Evaluación de la educación profesional en Yakutia occidental

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ABSTRACT:

The object of this study was to review and evaluate the state of professional education in Western Yakutia. Methods included analyzing survey data for the current condition of professional educational institutions. Results have been provided for a survey of Western Yakutia residents regarding quality, satisfaction, and the development of professional education in the region, as well as a survey of senior engineering students regarding their level of professional readiness. The priority directions and contemporary challenges were revealed in the sphere of the specialist training focused on the region's socio-economic needs, using intensification of the network educational programs with leading domestic universities in technical areas; online education; improvement of the professional orientation work not only among the students, but also among the adults. The presented material may be useful for the specialists of professional education matters.

Keywords: professional education, professional readiness, training of engineering and technical specialists.

RESUMEN:

El objetivo de este estudio fue revisar y evaluar el estado de la educación profesional en Yakutia Occidental. Los métodos incluyeron el análisis de datos de encuestas para la condición actual de las instituciones educativas profesionales. Se han proporcionado resultados para una encuesta a los residentes de Western Yakutia con respecto a la calidad, la satisfacción y el desarrollo de la educación profesional en la región, así como una encuesta a estudiantes de ingeniería de alto nivel con respecto a su nivel de preparación profesional. Las orientaciones prioritarias y los desafíos contemporáneos se revelaron en el ámbito de la capacitación especializada centrada en las necesidades socioeconómicas de la región, utilizando la intensificación de los programas educativos de la red con las principales universidades nacionales en áreas técnicas; educación en línea; El mejoramiento del trabajo de orientación profesional no solo entre los estudiantes, sino también entre los adultos. El material presentado puede ser útil para los especialistas en asuntos de educación profesional.

Palabras clave: formación profesional, preparación profesional, formación de especialistas en ingeniería y técnicos.

1. Introduction

At present, there are several main factors influencing Russian professional education. These include qualitative changes in society's attitude toward the education system and the culture of education; a shift away from old educational models; the influence of international trends on education; and the relationship between commercial business structures, the state, and basic/vocational educational institutions. Acting as trends in the development of human society, globalization, financialization, transnationalization, post-industrialization, informatization, etc., are shifting the state's policy emphasis from innovation management towards interactive engagement processes (Firsova & Narkhova, 2013).

Innovative economic developments for any part of the Russian Federation should begin with universities, which are the basis of fundamental science, personnel training, innovation transfer, and entrepreneurship development in the region. E.A. Osipova (2012) notes that developing an effective regional educational policy is only possible after analyzing the educational space development of the region, social and pedagogical marketing of educational needs and quality of services, design of innovations, and identification of new factors leading to positive changes in the quality of education.

Currently, labor activity in the Republic of Sakha (Yakutia) is implemented in difficult functioning conditions of the labor market of the Northeast of Russia, which is characterized not only by the influence of a transforming market economy and foreign federal economic policies, but also the features and traditions of the region itself.

These factors include:

- socio-economic factors (prioritization of the diamond-mining industry, modernization of the mining industry, development of oil and oil refining industries, and so on);

- migration factors;

- regional factors (harsh climatic conditions, large territory, rich natural mineral and raw material resources, low population density, difficult transportation and delivery of basic necessities, multi-ethnic environment, and the low number of indigenous peoples of the north).

Consequently, when elaborating the priority areas for the development of professional education, it is important to consider the manufacturing potential of the Republic of Sakha (Yakutia), the condition of the labor market, and the identification of current and future personnel needs.

The government of the Russian Federation pays great attention to the development of the Far East, the Arctic and the northern territories of Russia. Thus, the "Socio-economic development strategy of the Republic of Sakha (Yakutia) until 2030 with distribution of the main directions until 2050" was developed (Strategy of Socio-Economic Development ..., 2016).

In this regard, a comprehensive evaluation program has been developed for the Republic aimed at the development of productive capacity and socio-economic conditions, supported by the Government of the Russian Federation (Yakutia), the Russian Academy of Sciences, and the Ministry of Education and Science of the Russian Federation.

From 2012 to 2018, the North-Eastern Federal University (NEFU) has implemented several projects aimed at evaluating the development of the territorial education systems, including the "Educational Map of the Republic of Sakha (Yakutia) project. Evaluation of the development of the regional education system of the Republic of Sakha (Yakutia)"; the project "Foresight of the Republic of Sakha (Yakutia) until 2050"; the project "Organization of complex scientific research in the Republic of Sakha (Yakutia), focused on the development of productive forces and social sphere of the Republic, including a comprehensive scientific expedition with participation of the Russian Academy of Sciences"; projects "Integrated evaluation of the Regional Education System Development of the Republic of Sakha (Yakutia)", "Development of Scientific and Methodological Basis for the Development of the Human Capital Forecasting of the Republic of Sakha (Yakutia)", within the framework of the comprehensive scientific research in the Republic of Sakha (Yakutia), aimed at developing the productive forces and the social sphere for the period from 2016 to 2020, etc. (Savvinov, 2018).

This study focuses on the most problematic points that may soon have a significant impact on the renewal processes implementing within the framework of the strategic documents of education development, assessment of functioning and elaboration of recommendations for the development of professional education, taking into account the specifics of remote and difficult to access areas and location of the productive forces.

Today, in connection with the introduction of monitoring the efficacy of professional educational institutions, the compilation and implementation of road maps of the education and production potentials of regions of the Russian Federation, indicators as tools for evaluating the functioning and prospects of the education system development have significant influence. So, experts note that these indicators include natural-climatic, socio-economic, scientific-regional, ethno-demographic conditions, dynamic development of education, etc (Savvinov, 2017).

To achieve the objective of the study, an analysis of features and matters of the professional education development in the region at the present stage has been performed. Thus, the works of Russian scientists are dedicated to these matter consideration (Zeer, 2015; Chistyakova et al., 2016; Ginerva et al., 2017; Savickas et al., 2009; Sokolova, 2014; Chistyakova, 2017a, 2017b; Tkachenko & Steinberg, 2017; Shmakova, 2017; Panina et al., 2016).

The object of the study can be defined as follows—evaluation of professional education; what is the readiness for the professional activity of the future personnel; what are the promising directions and forms of preparation in the professional education system development of Western Yakutia.

First of all, we would like to indicate generally the main directions of Russian professional education, as experts note: 1) integration into the world educational space; 2) integration of education, science and industry; 3) improving the professional education management; 4) increasing the availability and quality of the professional education; 5) diversification of educational activities; 6) training and retraining of the professional personnel. For example, among the problems of the secondary vocational and higher education are the following: low quality level of training graduates of educational institutions (especially secondary vocational education); insufficient financial, material and technical providing; personnel problems (aging of staff, often uncoordinated system of advanced training for teachers and industrial education masters); imbalance between supply and demand of qualified personnel; weak interaction of educational institutions of vocational education with schools and with labor market; reduction in the number of students; lack of motivation of employers to social partnership; problems with employment of graduates, etc.

It should be noted, that this number of matters concerns professional education of the Western part of the Republic of Sakha (Yakutia).

Western Yakutia includes sufficiently evenly populated uluses (districts) along the Vilyui River. The main specialization is mining (diamond-mining, oil and gas complex, geological exploration), timber and woodworking industry, energetics, building complex, transport, agriculture (Vilyui uluses). There are 211 thousand people, or 22 % of the Republic of Sakha population (Yakutia).

2. Methods

The study sample consisted of seven uluses (districts): Verkhnevilyuysky, Vilyuisky, Lensky, Mirninsky, Nyurbinsky, Olekminsky and Suntarsky.

To implement the objectives and tasks of the study, such methods were used as the static data analysis of the Federal State Statistics Service in the Republic of Sakha (Yakutia) (Data Base on the Educational Institutions ...; Education in the Republic of Sakha (Yakutia): Activity ..., 2016; The Republic of Sakha (Yakutia) by numbers ..., 2017; Annual of Statistics ..., 2016), public reports of the executive authorities of the Republic of Sakha (Yakutia), websites of professional educational institutions, etc.); survey of 411 residents of Western Yakutia on the professional education quality and development of the region; Pearson's survey and methodology on motivation for learning and readiness for professional activity of

3. Results

According to the analysis of the current condition of the professional education in Western Yakutia, there are nine educational institutions of secondary vocational education (SVE) under the Ministry of Education and Science of the Republic of Sakha (Yakutia) and the Ministry of Property and Land Relations of the Republic of Sakha (Yakutia).

In case of consideration in detail on possibilities of the educational institutions of secondary vocational education (SVE), we can say that, for example, GAPOU RS (Yakutia) Regional Technical College, established on the basis of vocational school No. 22, trained construction metal workers, combine operators, turners, millers and electric welders for tunneling teams, and further personnel for the diamond industry for the AK "ALROSA". The Verkhnevilyuysky Technical School graduates qualified workers serving for agriculture, forestry and fisheries of the Republic and mid-level specialists in engineering and technology for land transport, technospheric safety, environmental engineering, and jurisprudence. For the training of personnel of the largest oil and gas companies OAO "Gazprom", OAO "Sakhaneftegaz", OAO "Yakutsk Fuel and Energy Company", OAO "Sakhatransneftegaz", the Vilyuisk Technical School was founded. The relatively young educational institution Lensky Technological Technical School and its Peleduya branch provide qualified specialists in the field of automobile transport, energetics, metalworking, agriculture, public catering and technosphere safety. In 2016, the Nyurbinsk Technical School was opened with the aim of training and raising the level of skills for mid-level specialists and workers for the mining industry, operation of land transport and electric power industry, for example, master of general construction works, machinist at open mining, etc. Also, the mid-level specialists for operation of energy facilities, housing and public utilities of the Republic of Sakha (Yakutia) are being prepared by the Svetlinsky Industrial Technical School.

We have revealed that the number of students in the educational institutions of the SVE has a tendency to increase, so in 2011 there were 2 366 students and already in 2016–4 116 students. We believe that it is associated with the opening of new educational institutions and new training programs for specialists and workers, taking into account the needs of the Republic, the implementation of additional educational programs and the training of skilled workers with the provision of paid educational services. The analysis of the results shows that the state of material and technical base of educational institutions is generally satisfactory, but 15.6 % of the existing buildings require major repairs. The standards for specific indicators of the total area of educational institutions comply with federal standards. The implementation of the main professional educational programs is provided by competent pedagogical personnel with an appropriate educational level, who have undergone advanced training or retraining in the past five years.

The number of graduates who studied at the expense of the State budget of the Republic of Sakha (Yakutia), employed during one year after graduation for the received specialty, is 80 %. Regarding the level of financing of the SVE system, there is also a planned increase. According to the statistics, the expenses of the regional consolidated budget for professional education per 1 student, the institutions of professional education, compared with 2011, increased by 4 000 rubles: from 133 000 to 137 000 rubles.

As for higher education, since 2016, only one university is functioning in Western Yakutia—the Polytechnic Institute (branch) of the NEFU in the Mirny town (MPTI), which trains highly qualified personnel for the diamond mining, oil industry, energetics and education. However, over the past three years there has been a decrease in the number of students. Thus, in 2014 there were 803 persons, in 2015–763 persons and in 2016–718 persons. The reasons for this phenomenon may be the tendency to increase in the average score of the unified state exam in all specialties and forms of study; reduction of control figures for admission due to budget allocations; duplication of directions (mining, oil and gas business and geodesy) with the head university of the NEFU; migration of the young part of population to other subjects of the Russian Federation.

At the same time, such a positive trend should be mentioned, as the demand among graduates of the technical specialties of the Republic schools, it confirms the presence of a contingent of students from twenty-five districts and uluses of the region. The engagement of foreign students to study at universities is also noted.

As for the infrastructure of the university, in 2017 a new teaching and laboratory building with 500 seats was opened with the newest laboratory equipment for the needs of mining, oil and gas departments, which will undoubtedly affect the quality of training. Recruitment of the university graduates meets its basic requirements, meets the needs of the regional labor market; graduates work in AK "ALROSA", "Surgutneftegaz", "Gazprom", "Transneft", "Rosneft", etc., also in large international corporations: "Microsoft", "Samsung electronics", "Air Force", "Atlas Copco", etc. The main customers of the specialists are OAO "Alrosa", the Ministry of Economy and Industrial Policy of the Republic of Sakha (Yakutia), the Ministry of Housing and Public Utilities and Energetics of the Republic of Sakha (Yakutia), the State Committee of the Republic of Sakha (Yakutia) on geology and mineral resource management, etc.

However, the results of analysis of the professional education in Western Yakutia show that there is a tendency to reduce the number of students in general, which is associated with the closure of branches of central universities, particularly in rural areas.

In order to study the quality of professional education services provided, a survey of 411 residents of towns and settlements in Western Yakutia was performed (Table 1).

Table 1
Which type of professional education should be developed in Western Yakutia?

Nº	Response	Number of responses in %
1.	Training of working professions	26.5
2.	Training of mid-level specialists in institutions of vocational education	23.9
3.	Higher education	23.2
4.	Continuing professional education	9.2
5.	Cannot say	17.1

Thus, to the question: "What type of professional education should be developed in Western Yakutia?" 26.5 % of the responders answered that it was necessary to train for working professions; 23.9% noted training of the mid-level specialists in institutions of vocational education; 23.2 % believed that it was necessary to develop higher education; 9.2 % – continuing professional education, while 17.1 % of respondents found it difficult to answer. To the question: "Where will your children and grandchildren study?" 35.5 % of the responders indicated universities in the territory of the Republic of Sakha (Yakutia); 26 % of respondents predicted education in universities outside the Republic; in the institutions of the SVE of the Republic – 6.7 %; in foreign universities – 5.2 %, in the SVE institutions abroad – 1.8 %, and 20.6 % of responders found it difficult to answer.

The main results of the population survey evidence that it is necessary to develop secondary vocational education not only in Western Yakutia, but also in the Republic as a whole in order to train specialists of working professions and mid-level managers, which corresponds to socio-economic needs of the region. The survey results show that the majority of participants are satisfied with the quality of education, material and technical condition, infrastructure, employment of graduates of state vocational educational institutions. In

future, residents predict education of the subsequent generations in institutions of the professional education in the Western part of the Republic.

As part of a pilot study to research the degree of readiness of the future engineers for professional activities in the specialties "Mining", "Oil and gas business", "Electric power industry and electrical engineering" in the MPTI, a survey was organized among the senior courses students. Thus, to the question: "Are you satisfied with the learning process in the chosen profession?" 54 % of the senior courses students answered "totally", the average level of satisfaction showed 18 % of the responders, not satisfied–3 %, while 25 % found it difficult to answer. To the question: "Do you think that your professional education meets the requirements of the future employer?" the majority of students, 78 %, answered that their preparation was quite adequate, 16 % had doubts and 6% thought that they were not well prepared in accordance with the manufacturing requirements.

The professional cycle of educational programs for the training of engineering and technical personnel in the Arctic area and areas equivalent to it includes special practical training in accordance with national and international standards, which provide for the readiness of specialists to make decisions in extreme situations. Obtaining such knowledge gives confidence to the students that their professional qualifications meet the requirements. Therefore, to the question: "Are you ready for professional activity?" the following answers were received: "not ready"–6.5 %, "have doubts"–20.8 %, "interested in association of their activities with work in Western Yakutia and in the Arctic area"–44.3 %, "in a greater degree"–27.6 %, "tend to professional activities in difficult Arctic conditions"–18.1 %, and found it difficult to answer–10 %.

To the question: "How much do you feel involved in the development of the Mirny town and of Western Yakutia as a whole?" 39 % of students "fully" or "partially" felt their involvement, "did not feel their involvement, but would like to"–28 % and another 33 % had "other interests".

4. Discussion

Finally, according to a survey conducted among the senior courses students, it was found that 72 % of responders intend to associate their professional training with work in Western Yakutia. Readiness for the professional activity is determined, in our opinion, by the level of motivation for learning, as we calculated the correlation coefficient according to the Pearson formula between indicators of satisfaction with the education process in the chosen profession and the readiness to work under conditions of the region. This indicator is equal to 0.862, hence it follows that there is a direct relationship between the satisfaction of the education process and the readiness to continue working in the region. It means that the orientation for the future professional activity was consciously made by the students, and their readiness is successfully formed in the process of mastering professional competencies.

As rightly notes T.I. Radionovskaya (2015), the future engineer's readiness to act in a critical situation is manifested in professional experience and has two properties, such as stability and variability. Thus, the stability factor determines social and professional significance, while variability determines the ability for conscious socially significant changes in the rapidly changing world. In this regard, in the educational process for the preparation of the future engineers in the MPTI various educational technologies are used, such as organization of project activities technology, productive technologies, technologies aimed at teamwork, technologies for developing critical thinking, etc. We have investigated that readiness to act in the extreme situations is manifested in professional experience at three levels:

- Automatic manifestation of professional functions as an opportunity to eliminate a critical situation;
- Creative search for the causes of a critical situation from the analysis of already known experience of such circumstances;
- Heuristic analysis and search for the causes of a non-trivial professional situation as unforeseen for its alteration and possible elimination.

Namely high-quality professional training of specialists under conditions of increased labor

risk, in our opinion, may be provided with a system of continuous education. So, students of secondary vocational education institutions, high school students of Western Yakutia are engaged in a "virtual technical school", the Small Engineering Academy of the North-Eastern Federal University. Practice oriented courses are continually conducted for retraining and advanced training of engineering and technical personnel.

Therefore, in the system of continuing education, students form professional readiness of the necessary competences to work under difficult climatic conditions. We reasonably believe that young people who receive engineering and technical education are aware of the importance of the acquired profession for the further development of the region and ensuring the interests of Western Yakutia.

Most of participants of the future specialists survey are ready to apply the knowledge and competencies they have gained in meeting the challenges of the territory development and modernizing the infrastructure of the region as a whole. In our opinion, it is facilitated by the introduction of new forms of the professional education integration and enterprises-employers, a project is being actively implemented within the "World Skills" championship, aimed at raising the standards of professional training and qualifications of students.

According to the results of analysis and surveys, we believe that it is necessary to more actively create network educational programs with leading domestic and foreign universities in the following areas: metallurgy, mechanical engineering and material processing; mathematics and mechanics; applied geology, mining, oil, gas and geodesy; energetics, power engineering and electrical engineering; to intensify forms of distance education, online learning, electronic learning; improve professional orientation activity among schoolchildren not only of Western Yakutia, but also of other regions of the Republic of Sakha (Yakutia), and the Russian Federation as a whole (with the help of opening the virtual technical classes, the development of the Junior Skills competition, participation in the "Ticket to the Future" project, engineering and IT Olympiads, etc.); integration of educational and learning resources and programs into a single regional system of continuous engineering-geological education, IT education, etc.; the development of continuing professional education; based on the forecasting occupations by 2030, consider the introduction of new specialties and profiles in the professional educational institutions (for example, specialist in energy markets, energy auditor, energy store designer, system manager of composite materials, designer of nanotechnology materials, recycling technologist, cyber researcher, neuro-interface designer, system mining engineer, screen analyst in mining industries, telemetry data interpreter engineer, robotic system engineer and others).

5. Conclusion

Consequently, analysis of the educational process in institutions of secondary vocational education and higher education; studying the readiness for professional activities of future engineers; the region residents survey show that the current system of professional education provides training for qualified personnel in Western Yakutia, but at the same time, it is necessary to preserve traditions and to introduce innovative educational technologies in personnel training, taking into account professional and educational needs of each studying individual and manufacturing development requirements. We also believe, that it is necessary to wider use the investment projects in the region, which will undoubtedly allow solving socio-economic matters (increase in youth employment, income, etc.), and will also create a new point of economic growth in the Far East of the Russian Federation.

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