opción

Revista de Antropología, Ciencias de la Comunicación y de la Información, Filosofía, Lingüística y Semiótica, Problemas del Desarrollo, la Ciencia y la Tecnología

Año 36, 2020, Especial N° 27

Revista de Ciencias Humanas y Sociales

ISSN 1012-1587/ ISSNe: 2477-9385

Depósito Legal pp 198402ZU45

Universidad del Zulia

Facultad Experimental de Ciencias

Departamento de Ciencias Humanas

Maracaibo - Venezuela

Opción, Año 36, Especial No.27(2020):1098-1114
ISSN 1012-1587/ISSNe: 2477-9385

The model of specialists' training and retraining in high technologies

Mikhail V. Tarasov[1]
[1]Russian State Social University, Moscow, Russia
mihael-tarasov@yandex.ru

Muliat M. Tkhugo[2]
[2]Moscow Aviation Institute MAI (National Research University), Moscow, Russia
tkhugo@mail.ru

Sergey A. Polevoy[3]
[3]Financial University under the Government of the Russian Federation (Financial University), Moscow, Russia, Russia
SAPolevoy@fa.ru

Dmitriy V. Miroshkin[4]
[4]Sechenov First Moscow State Medical University, Moscow, Russia
dvm-anatom@yandex.ru

Natalia A. Krasheninnikova[5]
[5]Ulyanovsk State University, Ulyanovsk, Russia
Kna.73@mail.ru

Elena V. Pronina[6]
[6]Moscow State Technical University of Civil Aviation, Moscow, Russia
ev_pronina@mail.ru

Abstract

The paper aims to investigate the model of specialists' training and retraining in the field of high technologies via a theoretical and methodological analysis of the problem and monitoring research. As a result, psychological training aimed at developing professionally important personal qualities of a specialist, should be a necessary element in the content of the educational process. In conclusion, the contemporary system of higher professional education should ensure

Recibido: 20-12-2019 •Aceptado: 20-02-2020

the development of a professional who is able to verify, evaluate, creatively synthesize information, disclose the essence of the problem, and make adjustments to previous conclusions based on new findings.

Keywords: Educational modules, Methodical complex, Commercialization.

El modelo de formación y reciclaje de especialistas en alta tecnología

Resumen

El documento tiene como objetivo investigar el modelo de capacitación y capacitación de especialistas en el campo de las altas tecnologías a través de un análisis teórico y metodológico del problema y el seguimiento de la investigación. Como resultado, la capacitación psicológica dirigida a desarrollar cualidades personales profesionalmente importantes de un especialista debe ser un elemento necesario en el contenido del proceso educativo. En conclusión, el sistema contemporáneo de educación profesional superior debería garantizar el desarrollo de un profesional que sea capaz de verificar, evaluar, sintetizar creativamente la información, revelar la esencia del problema y hacer ajustes a las conclusiones anteriores basadas en nuevos hallazgos.

Palabras clave: Módulos educativos, Complejo metódico, Comercialización.

1. INTRODUCTION

In the context of modern technological challenges, the key objective in the activity of the Government of the Russian Federation outlined in the Decree of the President of the Russian Federation of May 7, 2018 No. 204 on national goals and strategic tasks of the development of the Russian Federation for the period till 2024 is to

accelerate the country's technological development and increase the number of organizations that provide technological innovation. The significance of the development of high-tech areas is due to the possibility of obtaining results and the formation of competences required to implement new priorities of the scientific and technological development in the Russian Federation which can meet great challenges (FALEEVA, BRATUKHINA, EZHOV, GORBUNOVA, LOPANOVA, VIAZNIKOVA & KRYUKOVA, 2017). In particular, the shift to advanced digital, intelligent manufacturing technologies, the creation of systems for processing large amounts of data, artificial intelligence will ensure the country's readiness for great challenges that have not yet manifested themselves and have not heightened public awareness of them, provide for a timely assessment of the risks caused by scientific and technological development.

At present, one can see an increasing role of high-tech industries in the economic development of countries and regions. According to numerous studies, such countries as the USA, Japan, Germany, Great Britain, France currently have the most significant scientific, technical and technological potential. The sectors of high and knowledge-intensive technologies have a peculiarity of high growth rates and a synergistic effect on the development of both related industries of the country and not connected to high-tech production. The global challenges that the world is facing require a radical transformation of national economies, including their technological modernization, deep structural change, and institutional restructuring.

Overcoming them for Russia is still delayed for the future and relevant approaches and tools are often considered innovative and controversial. However, at present, both in the scientific community and in official circles, the intensification of innovative activities in the field of high technologies is being actively discussed, including in the context of strengthening national economic security. The selection of the most effective tools to stimulate innovation processes in the high-tech sphere in various areas of the national economy that will increase the competitiveness of Russian manufacturers in the foreign and domestic markets and ensure the country's economic security is becoming extremely important in terms of various issues of theory, methodology and business practices (AGADZHANOVA & SALAKHOVA, 2018; DEBERDEEVA, POLEVAYA, TARASOVA & TARASOV, 2017).

In contemporary Russia, the national system of innovative economy is being formed which needs an immediate influx of competent, competitive specialists of the engineering and technical sphere who are ready for creative and initiative activity in the framework of national and international social engineering projects. The ability of specialists to correctly and efficiently present their technology or invention is of great importance. To develop such abilities, it is necessary to conduct educational seminars, webinars, networking. They will allow one to develop skills and effective interaction with the business environment. All this should be done by professionals who specialize in the commercialization of innovations and are a catalyst for bringing inventions and technologies closer to

business. Educational institutions around the world are called for the provision of training such professionals today. They form the personnel of the elements of the innovation system - venture capital funds, business incubators, technology parks (ALISULTANOVA, 2010; 2011).

2. METHODOLOGY

The importance of the process of integrating the lasting traditions of national education with those carefully selected innovations that are objectively claimed by the developing economy of the Russian Federation has been substantiated in recent studies on the training of specialists in the field of innovation and high technology. The dynamics of the ongoing transformations related to the testing of promising developments and their mobile implementation in today's educational process allows us to note that the competency-based approach to the process and the results of each cycle of professional and educational practice-oriented activity is mastered by teachers and students simultaneously as a part of their joint work aimed at creating innovative products.

However, it is not enough to have productive ideas and convincing experimental results for the quick and effective implementation of breakthrough technological solutions in production, even if significant investments can be provided (DOLZHENKOVA, POLEVAYA & RUDENKO, 2019). First of all, we need highly

qualified specialists with special competences - flexibility, mobility, the ability to successfully work in teams of variable composition and many other competences that are in high demand in the rapidly and unpredictably changing conditions of a globalizing world. Such specialists must be trained by developing and introducing innovative pedagogical technologies, sensitively responding to the constantly emerging challenges of the surrounding reality, using international achievements and professional communication opportunities of teachers from different countries (KORETSKAYA, DEDOV, POLEVOY & DNEPROVSKAYA, 2017).

When considering the issue of developing innovative education from the standpoint of ensuring its quality, it is important to note that the problem of the quality of training specialists is central to the question of their demand for the national economy and the international recognition of Russian specialists. It is directly related to the content of education and technology for the implementation of educational programs. Innovative education is being developed all over the world directed towards the formation of not only certain knowledge and skills in specialists in the field of innovation and high technologies, but also special competences focused on the ability to put them into practice in real life when creating new competitive products. Innovative training is focused on creating the conditions for a person’s readiness for rapidly advancing changes in society, for an uncertain future through the development of creativity, various forms of thinking, and cooperation with other people (KAMNEVA, POLEVAYA, POPOVA, SIMONOVA & BUTYRIN, 2019). The

specificity of innovative training is determined by its openness and transparency, the anticipation of results based on a constant reassessment of values, and the ability to act together in new situations.

The purpose of the didactic design of educational programs in higher professional education to train specialists for innovative activity is to determine the structurally substantive and organizational-procedural components that allow students to form competences required for developing the commercialization of an innovative product in a relevant professional field. The result of mastering innovatively-oriented educational programs by students in the field of commercialization of innovative and high technologies should be their mastery of an innovative culture, both general, including knowledge of the basics of innovation, and special - confirmed in practice, the willingness to use personal potential for successful innovation in a certain scientific and technical field (BELINSKAYA & PRONINA, 2017).

3. RESULTS AND DISCUSSION

Specialists' training in the field of commercialization of high technologies should be carried out in such an educational environment that will help to combine technological educational programs with theoretical and practical training in the field of innovation. Continuing education and distance learning as an integral combination of means,

methods, and forms of acquiring, deepening and expanding professional development of specialists allows us to significantly expand the scope of the educational space and provide access to educational resources of our country and other countries of the world community. The process of training specialists in the field of high-tech commercialization should consist of three blocks (Fig. 1).

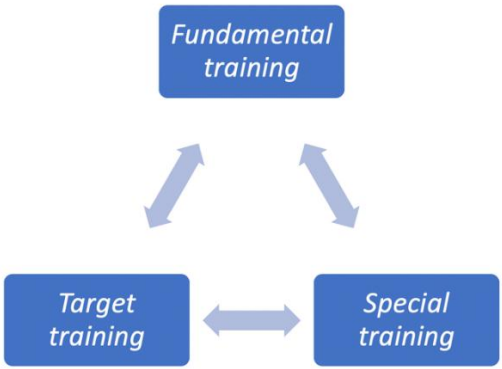

Figure 1: The process of training specialists in the field of commercialization of high technologies

1. Fundamental training - learning based on the study of the laws and laws of economic development;

2. Special training - training based on the study of the laws of management;

3. Target training - training based on the acquisition of real experience in a production facility.

A special place should be given to fundamental training which is an indicator and a catalyst for knowledge in the field of special and industrial training.

The training of specialists for the commercialization of high technology should be based on the concept of continuing education. Proceeding from this concept, the problem of the formation of specialists' professional competence in the field of commercialization of high technologies becomes very important.

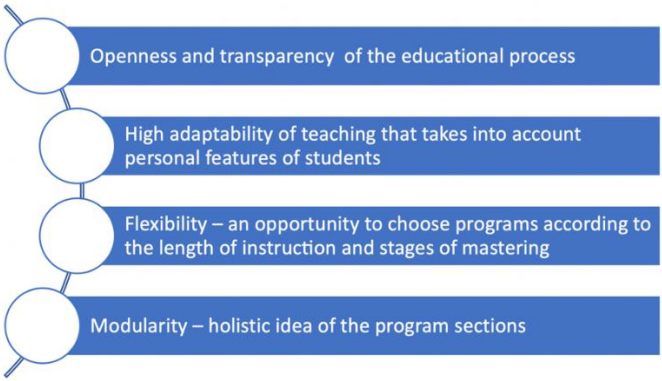

Figure 2: Educational program for training specialists in the field of commercialization of innovation

In these conditions, the methods for developing an educational program should be changed, since it must strategically meet the requirements of the market for high technology and labor markets or even outrun these requests. Innovative elements of the educational program are a system-forming factor that ensures the integration of the

educational process, scientific research and transfer of scientific knowledge.

The amount of discipline can include from 72 to 108 hours. Within the scope of this volume, lectures, seminars, laboratory classes and independent work should be provided. A test or an exam may be the form of control in each discipline. Based on the results of the training, a state certification exam is conducted, and the final qualification work is defended. Each program should have the following structural sections (Fig. 3):

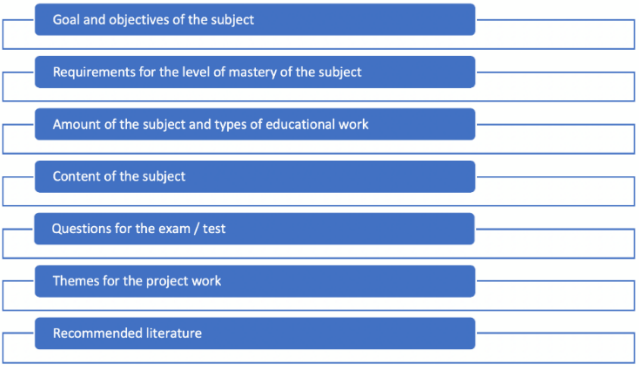

Figure 3: Structural sections (blocks) of the educational program

The main specific feature of the developed training and retraining programs for specialists in the field of high-tech commercialization is the orientation toward practical training of specialists in innovation management. The studied disciplines are a generalization of the main stages of the commercialization process, where tasks are performed based on work on specific projects, practical

skills in the market are acquired along with experience in promoting specific products on the market. The student gains precisely his production and organizational experience, which will allow him to build the paths of professional growth in the management and implementation of innovative projects in business agencies. Each developed program includes psychological interactive and active teaching methods directed to developing professionally important personal qualities of a specialist. As an example, we will cite the developed career guidance course: Development of a professional trajectory in the field of innovation.

The effectiveness evaluation of the program implementation in the course development of a professional trajectory in the field of innovation is based on information regarding a specialist's satisfaction with a course and the knowledge and skills acquired in the field of innovative technologies. Besides, the conclusion about the effectiveness of training should be made based on the satisfaction of the immediate supervisor with the effectiveness of training. It is advisable to conduct the manager's evaluation of the course one month after training.

At the end of long-term training, a specialist's effectiveness and performance who attended the course development of a professional trajectory in the field of innovation should necessarily be evaluated through the effectiveness of his production work in the field of introducing innovative products and technologies in a business venture. As a result of the course, each specialist acquires the necessary knowledge, skills, and abilities to realize his career potential in modern socio-economic conditions and he has a ready-made PCA. To analyze the implementation effectiveness of innovatively oriented programs for training students, we

conducted an empirical study. The empirical basis of the study was: 60 students, 30 of them were trained on innovation-oriented programs and 30 students were not included in the program.

The following diagnostic tools were used in the study: the technique for determining the motivational profile of a person; personality questionnaire (BURLACHUK, 2018). The validity and reliability of research results were provided by the initial methodological positions, the use of reliable and valid tools, representativeness of the sample, as well as the use of mathematical statistics methods. To process empirical data, the methods of mathematical statistics were used: Student t-test, correlation analysis.

As a result of the study, the following results were obtained.

With the help of the technique for determining a person's motivational profile proposed by BURLACHUK (2018) indicators on seven motivational scales were calculated. One can determine several patterns here. The first three indicators of motivational scales differ in that they are more than among the students of the control group: maintaining life support, comfort, social status. This may indicate that the students of the control group, proceeding from the theory proposed by E. Fromm, tend to maintain life and normal social existence of the individual, i.e. a consumer trend more than the students of the experimental group. Conversely, indicators of such motivational scales as general activity, creative activity, and public utility indicate the greatest expressiveness among the students of the experimental group of a personally developing or productive trend than among the students in the control group. Based

on the identified motivation scales, we determined the orientation of a person which reflects the implementation of innovative activity (Figure 4).

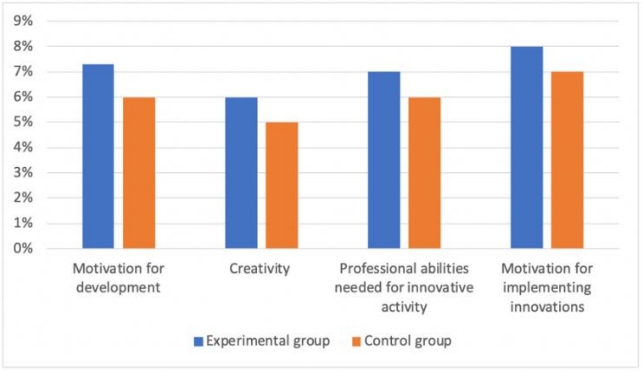

Figure 4: A person's orientation towards innovation

Proceeding from the identified personality orientations towards innovative potential, we have identified individual abilities that most clearly characterize each orientation (Figure 5).

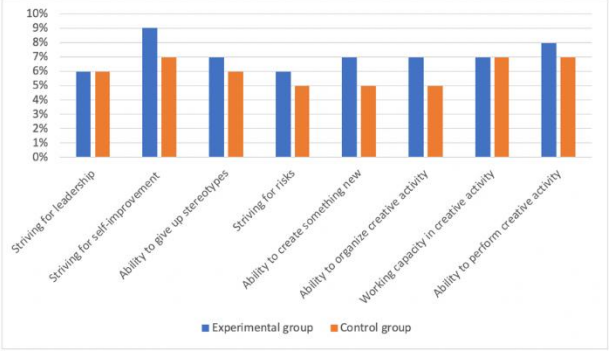

Figure 5: A person's abilities needed for innovative activity

The indicators of a person's abilities needed for innovative activity are more developed among the students in the control group. Some indicators of abilities have the same expression. Such as striving for leadership (6%) and working capacity in creative activity (7.4%). The largest scatter of indicators was found in the ability to reject stereotypes (control group - 7.3%; experimental group - 6.2%). The highest indicators in both groups are presented in the striving for self-improvement (8.2% and 7.7%), the lowest - striving for risk (5.7% and 5%).

Thus, the results of the study confirm the implementation effectiveness of innovation-oriented programs to develop innovative activity and the level of readiness for innovative activity among students in the system of higher professional education. Under the modernization of the contemporary system of education, the role of innovative activity is growing even more, as there is a need to update the content of education, to achieve a new quality of educational activity based on innovative initiatives. In this situation, scientific support and science-based innovation management are becoming the backbone of the development of the system of education.

4. CONCLUSION

The analysis of the results of training students according to innovation-oriented programs showed a rise in the effectiveness of their innovative activity and the level of readiness for innovative

activity. The results of the conducted monitoring show that a systematic approach to the design and implementation of educational programs is necessary not only at some universities but also at the national and international levels. Besides, for the training of specialists to be successful in the field of commercialization of high technologies, special attention should be paid to the development of an innovative culture, providing an understanding of the mechanisms of innovation and novelties.

Thus, the process of organizing specialists' training in the field of commercialization of high technologies will be successful when conditions are created and stimulate the development of needs in the search for and mastering of innovations; when the specialist understands that the needs of consumers are always the target of innovative activity; improving processes of introducing technology into practice; introducing innovations based on the simultaneous solution of parallel innovative problems.

Also, the implementation of retraining programs for specialists in the field of commercialization of high technologies indicates that the content of the educational process should include psychological training of students, aimed at developing professionally important personal qualities of a specialist. The implementation success of any program depends on the conditions required for its implementation. The implementation of an innovative educational program should be considered as a large-scale innovation in the organization. This is a

difficult task. Common sense and intuition are not enough to solve it successfully. Reliance on special knowledge is required.

REFERENCES

AGADZHANOVA, E., & SALAKHOVA, V. 2018. "Values and meanings in the context of modes of human existence: to have or to be". **Simbirsk Scientific Journal Vestnik.** Vol. 3. N° 33: 12-16. Russia.

ALISULTANOVA, E. 2010. **Competency-based approach in engineering education: a monograph**. Moscow: Academy of Natural Sciences. Russia.

ALISULTANOVA, E. 2011. "Competence approach as an innovative dominant of engineering education". **Humanities and Social Sciences.** Vol. 1, pp. 157-163. Russia.

BELINSKAYA, D., PRONINA, E. 2017. "Modeling the psychological selection and training of personnel and its impact on economic efficiency". **Economics and entrepreneurship**. Vol. 4. N° 2: 1010-1014. Russia.

BURLACHUK, L. 2018. **Psychodiagnostics**. St. Petersburg: Peter. Russia.

DEBERDEEVA, N., POLEVAYA, M., TARASOVA, T., & TARASOV, R. 2017. "Assessment of students' stress tolerance based on modern psychological techniques". **Theory and Practice of Physical Education**. Vol. 10; 101-102. Russia.

DOLZHENKOVA, Y., POLEVAYA, M., & RUDENKO, G. 2019. "A new wage system in public health: an analysis of practice and implementation problems". **Problems of Social Hygiene, Healthcare and Medical History.** Vol. 27, N° 4; 452-458. USA.

FALEEVA, L., BRATUKHINA, E., EZHOV, S., GORBUNOVA, L., LOPANOVA, A., VIAZNIKOVA, L., & KRYUKOVA, N. 2017. "Student's social experience forming in university vocational training". **Eurasian Journal of Analytical Chemistry.** Vol, 12. N° 7: 1127-1135. Malaysia.

KAMNEVA, E., POLEVAYA, M., POPOVA, A., SIMONOVA, M., & BUTYRIN, G. 2019. "Job satisfaction and professional burnout of high school teachers". **International Journal of Applied Exercise Physiology.** Vol. 8, N^{o} 2.1: 751-755. Iran.

KORETSKAYA, I., DEDOV, N., POLEVOY, S., & DNEPROVSKAYA, N. 2017. "Psychological aspects of organizing a health management system in a university". **Theory and Practice of Physical Education**. Vol. 7, pp. 23-24. UK.

UNIVERSIDAD
DEL ZULIA

opción
Revista de Ciencias Humanas y Sociales

Año 36, Especial N° 27 (2020)

Esta revista fue editada en formato digital por el personal de la Oficina de Publicaciones Científicas de la Facultad Experimental de Ciencias, Universidad del Zulia.
Maracaibo - Venezuela

www.luz.edu.ve

www.serbi.luz.edu.ve

produccioncientifica.luz.edu.ve