INTEGRATION OF EDUCATION, SCIENCE AND PRODUCTION AS A BASIS OF AN INNOVATIVE EDUCATIONAL PROCESS

Sariyev Rustam Bobomuradovich
Doctoral student of the Bukhara Engineering Technological institute, **UZBEKISTAN**
E-mail: srustam_79@mail.ru

ABSTRACT

Development of an innovative educational process. Using the achievements of science and technology in practice. Blocks of educational, scientific and innovative complexes. Integration of different types of associations on the basis of the university to improve the quality of education, research activities, training specialists for active innovation.

Keywords: Integration, information, innovation complex, innovation infrastructure, channel of the innovation complex, educational, scientific and innovative complexes, intellectual.

INTRODUCTION

The development of an innovative educational process occurs directly or indirectly under the influence of a whole set of socio-economic, scientific and technical, socio-cultural and other factors. At the same time, the basis of its development is the integration of education, science and production.

To date, the necessary and sufficient theoretical base and experience have been formed for deep understanding and further development of research on integration processes in education, science and production.

There is a dialectical unity of educational and material and economic potential. They are interconnected and condition each other. At the same time, the educational potential should outstrip the material and economic potential in development. A slowdown in the development of educational potential will inevitably affect the economy and material production, which, in turn, have a significant impact on the dynamics of the development of education in society. In other words, the principle of the advanced development of the economy and material production can be successfully implemented through the principles of the advanced development of education and science, the advanced reproduction of highly qualified scientific personnel for various areas of society.

At all subsequent stages of the development of education, science, technology, production, the tendency of transformation of material production into the technological application of science, and science, to an ever greater extent, into the productive force of society should be the leading trend.

They dialectically assume each other and act as links in a single educational, scientific and production process.

Mathematics, mechanics, physics, chemistry, technical sciences arose in the process of material production and, as they develop, more and more acquire the ability to "self-propulsion", grow into a "direct productive force".

Material production, in turn, determines and accelerates the development of science and technology.

Science, having arisen on the basis of the needs of social production, gradually turned into a driving force that ensures its growth and improvement. The transformation of science into a direct productive force convincingly testifies not only to the maturation of the socially transforming role of science, but also to changes in the characteristics of production, which are increasingly revealing their capabilities regarding the technological embodiment of the results of scientific knowledge. This is where the specific dialectic of the interaction of scientific-theoretical and industrial-practical activity is manifested: production, acting as the foundation of science, at the same time, in a perspective respect, turns out to be a projection of the technical possibilities opened up by scientific knowledge. Such a reverse effect of science on production is determined by the peculiarities of social and historical practice, which includes not only material production experience, but also the experience of scientific and social activity.

Such a specific dialectic is manifested in the interaction of scientific-theoretical, production-practical and educational activities in a higher technical school.

This process is intensifying as the industrial society transitions to a post-industrial state associated with the introduction of electronics, information, information and telecommunication technologies. It is necessary to carry out a transition from traditional types of technology associated with various kinds of external influences on the subject of labor, to modern types, characterized by influences at a qualitatively new level: cellular, molecular, atomic. The latter will make it possible to purposefully change the structure of living and inanimate matter. New progressive types of technologies will appear based on biological, electron-beam, plasma, radiation, membrane processes. New technologies, as a set of new methods of processing, manufacturing, changing states, properties, forms of raw materials, materials used in the production process to obtain finished products, give a qualitatively new product. Its production already requires a minimum amount of human labor, is carried out by resource-saving labor (based on the use of synthetic and composite materials), is environmentally friendly, reliably controlled in order to achieve a given product quality based on modern production methods.

With the increasing complexity of technology, an increasing proportion of production tasks are solved by means of automation. The person is left with the most difficult and responsible tasks associated with the diagnosis and elimination of failures in the operation of equipment and violations in the course of the technological process in conditions of a sharp shortage of time. Working in this mode requires increased energy consumption, intellectual, emotional stress, volitional efforts. The latter, in some cases, can exceed the real capabilities of the human body and psyche, lead to a breakdown in its activities.

A person, speaking in the technical system of communication channel control, shows the throughput of the processed information not only depending on professionalism, but also on personal qualities: motivation, mental properties, mental states, etc. Considering these factors, the machine-centric approach (“from the machine - to man ") a new anthroponcentric approach to the design of technical control systems (" from man to machine ") began to form, based on an understanding of the relationship between man and machine as a subject and tools (means) of labor.

The development of the production of the future with a high degree of perfection, reliability and technical and economic efficiency of the production process, its equipment is beginning to approach highly organized systems of living nature. On this path, the need for the synthesis of a wide range of sciences will increase, but, first of all, the sciences of a biological, technical, technological, economic, ecological and psychological profile.

The above tendencies will manifest and develop in the engineering and innovation and research activities of specialists from various branches of science and production.

So, in the development of the fuel and energy complex - this is the provision of deep oil refining processes, the development of environmentally acceptable (mainly by open method) technologies for the extraction, use, complex processing and enrichment of coal, the renewal of energy equipment through the introduction of gas turbines and combined cycle plants, the development of technologies for processing industrial waste, non-traditional and renewable energy resources. In the oil refining and gas industry, it is necessary to train personnel capable of ensuring the development of new capacities. In the metallurgical complex - the development and implementation of advanced energy and resource-saving, environmentally friendly technologies, updating the main technological equipment, mastering converter and electric steel-making technologies combined with sheet rolling, expanding the range of products, reconstructing pipe production. In the chemical, petrochemical, medical, microbiological industries - the creation of new technologies for the production of phosphorus and complex fertilizers, the processing of their production waste, technologies for the production of environmentally friendly plant protection products, engineering plastics, synthetic resins, fibers, threads, tires for small cars, buses, trucks and extra-large vehicles, as well as polyethylene, polypropylene, polystyrene, polyvinyl chloride, synthetic rubber and others. In mechanical engineering and metalworking - the creation of modern technological equipment for the production of oil products, gas, the mechanization of coal production, the production of cars, machine tools and tools, all types of vehicles, construction and road machines, printing equipment, as well as machines for the textile and light industry. High-tech production based on the use of new flexible technologies, new functions of labor, required the training of appropriate specialists.

The previous periods of the development of society were characterized by a relatively slow evolution of social production, which determines the constancy of the structure and content of education, in which the knowledge and skills acquired by a person retained their value and relevance throughout his professional activity.

In modern conditions, the rate of revolutionary changes in technology, technology and forms of labor organization began to exceed the rate of change of new generations of people. This made it necessary to change the content and structure of engineering activities.

Determining the breadth of the profile of a specialist's activity involves defining the boundaries of his activities both in terms of the levels of work performed, and in terms of the spread of the scope of activities in the field of material production, transport, communications, etc. and solving complex complex, integrative tasks that go far beyond production as a purely material system.

Material and methods

Dialectically contradictory processes take place in the development of engineering activity. On the one hand, new branches of production, new specialties, and, hence, new types of engineering activities appear. In addition to mechanical engineering, already sufficiently developed by this time, radio engineering, instrumentation, chemical technology, etc. appeared. New specialties focused on one object of labor were "gyroscopic devices", "geophysical equipment and apparatus", "means of dispatch and technological control of power systems" and etc. On the other hand, the deep differentiation of engineering activity, in turn, gave rise to an opposite process - integration. Since the middle of the 20th century, the problem of integration has already been posed, combining various specialties (related, related, even unrelated) into one, and various specialists - into one team, solving a common engineering problem.

The breadth of the profile (design engineer, process engineer, mechanical engineer with specialization "ecologist", "economist", "translator", etc.) is often focused on several objects of labor. In this case, one of the functions can be leading, the rest are associated with it: computational and design, design and technological, test and research, control, etc. or the main functions of the production cycle - design, development of a technological process, installation, adjustment, adjustment, testing, manufacturing quality control, maintenance and repair. A thorough knowledge of the essence and content of the functions performed, the ability to carry them out enables the specialist to quickly master new objects of labor, new equipment, i.e. provides the ability to restructure in the event of a change in the object of labor, equipment, technology and creates conditions, if necessary, for the transition from one industry to another. Naturally, not all functions included in the wide-profile field of professional activity can enter into integration with each other, especially if they belong to different specialties: engineer-psychologist, engineer-economist, engineer-translator. Thus, the broad profile integrates homogeneous and heterogeneous fields of professional activity. It is distinguished by a wide range, a variety of functions performed, types of activities (technical, technological, economic, environmental, sociological, psychological, etc.), an increase in the volume and complexity of calculated control, management and analytical functions, as well as mathematical calculations and calculations using the laws of physics , chemistry, electronics, cybernetics, economics, psychology. Expanding the boundaries of wide-profile professional activities expands the functions.
As you can see, a wide-profile engineering activity has a fundamental difference from a narrow-profile one, which is focused on a specific job of an engineer in the functional structure of industry production. It is characterized by:

- the number of specialties included in the integrated profession of a broad profile, while the leading core profession and the prospects for its development are taken as a basis;
- combination, and in some cases the withering away of some functions;
- changes in the content of traditional functions;
- redistribution of functions;
- the emergence of new combinations (combinations) of functions.

The need to use the achievements of science and technology in practice actualizes the task of scientific development of the "technology" of this process.

The experience of the development of advanced countries teaches that technical thought is currently capable of creating fully automated processes and, thereby, taking a person out of the production area. However, experience has shown that the greatest productivity is achieved by processes in which a reasonable combination of human abilities and the level of automation and robotization of processes occurs. The person is assigned control and management functions here. This model of the development of processes of harmonious combination of the abilities of engineers, technicians and the level of automation and robotization of processes should be called qualitative. Under this model, people, having learned to create equipment, production processes of the highest complexity, understand that it is not technical tasks, but human abilities that hinder the development of technical thought.

It is no coincidence that the development of new (third) generation standards is based on competencies as the ability to do something efficiently and efficiently.

With this model of development, society can implement the principle from each according to his abilities, since technological progress requires the implementation of this principle and it is in this development model that it first turns into state policy. This transformation is caused by the requirements of the technical progress of society and does not depend on its social structure, because it has risen to the level of awareness that only the potential of society's abilities restrains the pace of its development and the rational use of this potential. Japan, the United States, and Western European countries have embarked on this development model.

It is on the qualitative model of development that society understands that increasing the potential of people's abilities is the main direction of society's development, and therefore strives not only to rationally use this potential of abilities, but also to develop it as much as possible, thereby moving to an intellectual model of development.

By developing the natural abilities of people through education and practical activity, society seeks to increase the artificial intelligence of its people and, in a reasonable combination of artificial and natural intelligence, is looking for optimal ways to realize people's abilities.

Under these conditions, significant changes occur in the engineering activity itself, in its content and character.

Engineering activity is no longer limited to material production and the development of individual engineering objects, albeit rather complex ones, but goes into the sphere of socio-economic, socio-technical, ecological, psychological developments. Complex systems "man - machine - environment" become the object of engineering activity. It includes many other related and non-related professional activities. They cannot be considered outside of knowledge, skills, abilities and, in general, personal potential, which is the basis of socio-economic, scientific and technical, management activities. [2]

The development of science, technology, technology leads to changes in the structure of social needs and to the need to implement appropriate changes in the system of training specialists. In many developed countries, the number of industrial workers and agricultural workers is declining sharply. The level of labor productivity in industry and agriculture is such that less and less labor is required to fully provide the population with food and industrial goods. Many jobs of specialists with secondary specialized education are filled by people with higher education.

RESULTS

Educational, scientific and innovative complexes as integrated multipurpose multifunctional structures include a university, research institutes, innovative industries, technology parks, innovation and technology centers, certification centers, licensing, marketing, intellectual property protection, etc. They should strengthen the role of universities in the social economic, technological and educational development of regions and the country as a whole. [1]

Modern large educational, scientific and innovative complexes can be represented in the form of the following blocks.

"Internal" blocks - structural units of the university, formed either by the affiliation of institutions of organizations, or created by the university: lyceums, gymnasiums, colleges, institutes, branches, faculties, departments, postgraduate studies, doctoral studies, subdivisions of additional professional education, scientific laboratories, research institutes, engineering centers, pilot factories, pilot farms, clinics, technology parks, innovation centers, marketing, leasing, certification structures, small innovation firms, etc.

"External" blocks are educational, scientific, design institutions, industrial enterprises, small innovative enterprises, funds, innovation and technology centers, firms, companies, consortia, holdings, banks, local and regional government structures that are not part of the university, but they interact with them in the provision of educational services, in the implementation of scientific research, development, innovation projects, in the organization of the release and replication of finished science-intensive products, in the commercialization of research results and in the implementation of technological transfer.

Let us briefly dwell on the basic concepts related to the innovative complex of a higher school, university, and the infrastructure of this complex.

The innovative complex of a higher school is a network of higher educational institutions, research institutes, design bureaus, experimental plants and (or) pilot production facilities, farms, clinics, libraries, university technology parks, technology business incubators, innovation and technology centers, institutes or training centers and advanced training, small and medium-sized innovative enterprises, R&D and innovation support funds, service firms, agencies and other organizations whose activities and relationships contribute to the creation, modification and dissemination of new technologies based on the commercialization of scientific knowledge, discoveries, inventions of scientists, graduate students and high school students and the transfer of these technologies from high school to the economy and social sphere of the country for practical use.

The innovation infrastructure of a higher school is a set of components of the innovation complex of a higher school, which is of an auxiliary nature and ensures the productivity of the innovation complex as a whole. The innovative infrastructure of a higher school includes: technoparks, technology business incubators, innovation and technology centers, foundations, certification centers, centers for the protection of intellectual property, agencies, consulting, leasing and service firms, vocational training centers, etc., depending on the composition, state and functioning which depends on the scale and effectiveness of innovative activities of higher education in the scientific, technological and educational spheres.

The channel of the innovation complex of a higher school is a set of components of the innovation complex and its infrastructure, providing continuous generation, distribution and use of new knowledge for the development of one type of innovative technologies, their commercialization, transfer of scientific and technical products to the market. For example, a university, its design bureau, a pilot production, a technopark, and innovation activities, a university center for the protection of intellectual property, a metrology laboratory, a certification center, an advertising structure, industrial enterprises that together provide the generation of new knowledge, development, production of prototypes of technologies, products, materials, devices, their testing, certification and transfer to an industrial enterprise for manufacturing, for example, a batch of devices to solve energy saving problems.

An innovative complex of a higher educational institution is a network consisting of departments, laboratories, research institutes (scientific center), a technopark or innovation and technology center, a technology business incubator, small or medium-sized innovative enterprises, a certification center, a center for the protection of intellectual property, industrial enterprises - consumers products.

The channel of an innovative complex of a higher educational institution is a set of components of an innovative complex that provides continuous generation, distribution and use of new knowledge for the development of one technology, product, material, device, their commercialization and transfer of scientific and technological products to the market. For example, a laboratory, department or research center of a university, a technopark, an innovation and technology center or a technology business incubator, a university center for the protection of intellectual property, a metrology laboratory, a certification center for a given type of technology or product, a small innovative firm created by scientists and students as part of, for example, a technopark, an industrial enterprise together provide the generation of new knowledge, development, manufacture, commercialization of a product in demand by the population of the region, for example, a filter for drinking water purification. [3]

Discussion

This is how we see the role of higher education and higher educational institutions in the formation of an innovative way of development of domestic industry. However, this noble mission of higher education and universities can be fulfilled if we thoroughly study not only the innovative ability of universities and higher education in general, but also solve a number of problems associated, first of all, with the strict orientation of higher education and universities towards innovative activities , with strengthening ties with industry.

The view of the university as a social institution performing only an educational function has sunk into history. A modern university, especially a university, and especially a technical or technological university, is a scientific community that is able to generate new knowledge, use it to train specialists, disseminate knowledge, turn it into a commercial product to satisfy consumers of the economy and social sphere.

In this sense, the most "advanced" universities are educational, scientific and innovative complexes that actively influence the socio-economic and technological development of the country, region, city.

Conclusion

The integration of different types of associations on the basis of the university creates new opportunities for improving the quality of education, research activities, training specialists for active innovation. Such a combination allows obtaining results that, in principle, cannot be achieved even by large universities:

- create a continuous education system on a regional scale;
- build all levels of education into a single chain based on agreed state educational standards and training programs;

• create a unified information environment that provides access to educational institutions of the region to educational resources, new information technologies for teaching, textbooks, including electronic ones;

• provide high-level professional development, training and retraining of teachers, lecturers, teaching staff;

• to ensure the training of specialists of all levels of professional education competitive in the labor markets, as well as targeted training of personnel for the industrial and social sphere of cities and the region through the active influence of the university on the activities of institutions implementing programs of various levels.

REFERENCES

1. Шукшунов, В.Е. Концептуальные основы построения инновационной системы высшей школы / В.Е.Шукшунов, А.В.Павленко, Е.А.Нырков. – Новочеркасск: Изд-во Юж.-Рос. гос. техн. унта, 2004. – 46 с.
2. Шукшунов, В.Е. Инновационное развитие университетов / В.Е.Шукшунов. – М.: МАН ВШ, 2003. – 24 с.
3. Шукшунов, В.Е. Концепция университетского технического образования / В.Е.Шукшунов [и др.]. – М. – Новочеркасск, 2004. – 38 с.
4. Sariyev R.B , INTEGRATIVE ESSENCE OF TECHNOLOGIES INNOVATIVE EDUCATIONAL PROCESS, International Engineering Journal For Research & Development '(IEJRD), http://iejrd.com/index.php/%20/article/view/1399, 2020.