

# Training of Highly Qualified Specialists in the Electronic Industry Market on an Adaptive Basis

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**Abstract**—The publication is devoted to the study of the main aspects of professional training of highly qualified specialists in the market of electronic industry by substantiating and implementing innovative technologies of forming their competencies on an adaptive basis. The analysis of the peculiarities of professional implementation of electronic industry specialists in constantly changing conditions has been carried out.

**Keywords**—professional competencies, specialist, electronic industry market, educational space, adaptability to changing conditions, basics, professional higher education.

## I. PROBLEM STATEMENT

Domestic experience shows that the main driving force behind the transformation of the educational process is the process of qualitative transformation of the educational environment for students and other learners. The goal of this is to increase the autonomy and critical thinking ability of applicants through a performance-based approach. This approach involves the use of new methods for the design of learning programs, the teaching process, and the acquisition of knowledge. So, preparing high quality professionals in the electronic industry market involves developing students' ability to think critically, be competitive, solve professional problems effectively, and apply new methods in mastering knowledge and personal development. Therefore, this problem is much broader, and the search for new methods for training future specialists is extremely relevant in the context of modern world educational trends and allows them to be competitive in the labor market.

## II. ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

The problems of training specialists in the field of electronic industry, differentiated issues of functioning of the system of professional (vocational) education, issues of development of adaptive systems management and adaptive technologies in the educational process were studied. Monitoring studies on the level of implementation of adaptive processes in education and the formation of a

number of mandatory professional competencies in future specialists have been conducted by such scientists as G. Azgaldov, A. Asherov, A. Bagdueva, S. Batyshev, V. Boichuk, T. Borova, Z. Varnaliy, R. Vainola, V. Geyets, A. Dubasenyuk, G. Elnikova, N. Eroshina, L. Zaitseva, M. Klarin, I. Kozlovskaya, M. Koryagin, O. Mazur, A. Maximovich, T. Matsevko, I. Mishchenko, O. Nazarova, G. Polyakova, S. Strizhak, V. Sumtsov, N. Tkacheva, P. Tretyakov, M. Chik, K. Chuyko, T. Shamova, V. Shakhov, L. Shevchenko, V. Yachmeneva and others. However, in this paper we will refer to the works of those scientists who are aimed at researching the level and formation of the intellectual potential of specialists for the adaptive-digital environment.

## III. FORMULATING THE GOALS OF THE ARTICLE

The aim of the publication is to find new methods, based on the performance approach, to improve the quality of professional training of specialists in the market of electronic industry through the allocation, justification and practical implementation of educational components on an adaptive basis in higher education institutions.

## IV. STATEMENT OF THE MAIN MATERIAL

The current state and trends of active growth of indicators of intellectual development of Ukrainian society, scientific and technological progress and the transition to a new technological mode requires a certain transformation both in society and in the organization of the educational process in particular. Transformation should be aimed at the development of integration processes with advanced European institutions of higher education, taking place against the backdrop of progressive development of qualitative indicators of society. Expansion of international business-social relations should create prerequisites for educational activities in order to increase the human resource potential of specialists in all sectors without exception. In turn, this will not only help to determine the direction of the process of reform and transformation of the educational

sector, but will bring the quality of training specialists in line with the European labor market and thereby strengthen the competitiveness of the education system. The growth of the electronic industry market share in the country's economy requires a gradual increase in the supply of specialists with a certain set of general competences or even universal and narrowly specialized ones.

Taking into account the possibility to study in a dual form and get a second, third education and specialty, general competencies necessarily contain: the ability to think abstractly, analyze and synthesize; the ability to apply acquired knowledge in practical situations; skills to use information and communication technologies, the ability to communicate in a foreign language, etc. And such competences as the ability to work in a team, to show initiative and enterprise, to act responsibly and consciously, in our opinion, in general, are mandatory for a modern person regardless of his profession, education level and place of residence. The ability to preserve and multiply moral, cultural, and scientific values and achievements of society, to realize one's rights and obligations as a member of society, and to realize the values of civil society are universal human values that must be formed starting in pre-school education. But special competences, such as the ability to choose and use appropriate methods, tools to justify decisions in the digital environment and enterprises of electronic industry, can be formed and brought to the demanded level, depending on certain conditions, only in the process of receiving appropriate professional education. The modern labor market on the one hand needs the training of highly qualified and highly specialized specialists, and on the other hand, versatile, perfectly performing tasks, possessing modern professional knowledge and practical skills, but if necessary, quickly and efficiently adapting to the requirements of employers. And the ability to be ready to solve problems in changing and uncertain conditions are considered super competencies. This approach of the employer to the assessment of the specialist forces him/her to constant self-development and self-fulfillment. This is the main motive of an electronic industry specialist to maintain competitiveness.

Interconnection of the subjects of market relations, internationalization of innovative development at the present stage increases the relevance of revision of interaction between education and labor market, guided by the needs of society. In particular, the proper level of professional competences of electronic industry, possession of several qualifications within the profession; ability to effectively interact with specialists from other countries; aspiration to continuous self-development ensures the own competitiveness of an industry specialist, indicates his/her flexibility, mobility, adaptability, ability to self-development.

The development of electronic equipment and software, networks of Internet resources provide great opportunities for their use and application in the educational process of higher education institutions (universities and institutes), and modern innovative methods and means of learning allow to interest students and form an appropriate motivational mechanism with elements of research. Thus, the segment of applying one's competences expands, and reinforcing them with information technology allows one to be confident in one's place in the labor market.

Modernity and development of the educational process in Ukraine shows that education should be carried out and transformed at a certain time, it is necessary to conduct it more intensively, to create conditions for the disclosure of creative and non-standard ideas of students to achieve better results in learning, in addition, it is necessary to create adapted educational and methodological support to prepare high-quality professionals, which met modern conditions of the educational process and the labor market requirements.

The introduction of innovative solutions in the educational process, new methods and teaching technologies require special skills and focus of scientific and pedagogical staff of higher education institutions on personal and professional development, using additional opportunities for international mobility, participation in international scientific events, continuous professional development and use of best practices. Free access to Internet resources, innovative software solutions, information technologies provide additional opportunities both for the applicant and for teachers. It is not only about preparing educational and methodological packages, but also about collecting information and preparing for classes, creating new forms of knowledge acquisition through the introduction of hackathons, business games, theatrical performances, etc. Not only students are trained, but also teachers, who through active forms of learning together acquire the traits of independence and responsibility, flexibility and adaptability, variability, critical thinking.

The development of abilities and their adaptation to the changing working conditions in the digital environment, the definition of own professional interests and intellectual contribute to a constant search for yourself as a person and as a professional. Working in the electronics industry requires a constant search and study of innovative technologies, focusing on the latest electronic components (microcontrollers and FPGA). They are a mandatory component of highly complex, high-performance compact digital systems. Integrated software environments for the design of systems based on these components contain everything you need to develop multi-level verification of digital systems based on a programmable logic integrated circuit (FPGA) and microcomputer (MC). Digital systems are created by programming using serial microcomputers (MC) and parallel programmable logic integrated circuit languages and allow technical devices to acquire a new competitive level, significantly reduce the size and cost. Consequently, the result of their functioning is real and takes the form of profit from the activities of the company-manufacturer.

The application of modern educational and electronic technologies allows universities to be ahead in technical equipment and on its basis to train highly qualified specialists for current and future market needs. This is possible only with a high level of professional competence of scientific and pedagogical staff, capable of solving and teaching practical problems using mathematical methods, laws of physics and principles of electrical engineering. Ability to solve complex specialized problems, to identify and raise problematic issues related to the functioning of electrical systems and information networks, power supply stations and electrical substations; ability to develop projects of electric, electrical and electromechanical equipment in

compliance with the requirements of legislation, standards and technical specifications; to perform professional duties in compliance with the rules of safety, labor protection, industrial hygiene and environmental protection and others - this is only a short list of requirements for specialists in the electronic and electrical engineering industry.

Orientation to rapid changes in the educational process of higher education in Ukraine forms new goals and objectives in the process of educational training. Highly qualified specialist in the market of electronic industry should have adaptive skills to rapid changes and transformations together with fast-flowing requirements of labor market, among them not only knowledge of the basics of electromagnetic field theory and electrical circuit calculation methods, but the ability to use them to solve innovative practical problems; analyze processes in electric power, electrical and electromechanical equipment, related complexes and systems; be able to assess the energy efficiency and reliability of such systems; search for the necessary information, assess its relevance and reliability, and others.

The level of education and the level of personal development of a high-quality specialist on the basis of constantly changing requirements for him/her is a consequence of scientific and technological progress, appearance of new technologies, new methods of organizing business structures in electronic industry, connections between departments in the process of production. Employment of specialists and their work in the process of training will allow to be sure in future employment and willingness of employer to pay money for the result of competence usage for economic development of company. Reduction of social tension on the labor market; decrease of unemployment level; prevention of employee dismissal due to discrepancy between their educational and professional qualification level and new requirements of labor market will lead to fundamental changes in economy of the country. The introduction of competence-based approach to the content of higher education on the basis of educational reforms was fixed in the following legal documents: National Strategy of Education Development of Ukraine (course for the development and implementation of educational standards); Strategy of Sustainable Development Ukraine - 2020 (the right of citizens to have access to education, European

standards of living); Individual Priority Action Plans of the Government of Ukraine (creation of favorable conditions for the training of competitive professional staff), the Laws of Ukraine "On Higher Education", "On Education", "On Vocational (Professional) Education" and others.

#### V. CONCLUSIONS AND DIRECTIONS FOR FURTHER RESEARCH

Transformation of modern education imposes new requirements to the process of education, acquisition of knowledge and professional competences. The efficiency of practical activity of a modern highly qualified specialist in the market of electronic industry depends on the level of formation of his thinking, degree of readiness for professional activity, level of developed intellectual and creative personality, ability to make reasonable decisions and adaptability to labor market requirements. Under such conditions, training specialists in higher education institutions requires the introduction of innovative technologies that develop students' competencies.

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