

UDC 004

FEATURES OF SPECIALISTS IN INFORMATION TECHNOLOGIES TRAINING IN VITEBSK STATE TECHNOLOGICAL UNIVERSITY

ОСОБЕННОСТИ ПОДГОТОВКИ ИТ-СПЕЦИАЛИСТОВ В ВИТЕБСКОМ ГОСУДАРСТВЕННОМ ТЕХНОЛОГИЧЕСКОМ УНИВЕРСИТЕТЕ

¹Kazakou V., ²Alialseyeva A.

Vitebsk State Technological University, Republic of Belarus

E-mail: ¹wadimchik@mail.ru, ²elena_d@tut.by

Казакон В.Е., Алексеева Е.А.

Витебский государственный технологический университет, Республика Беларусь

ABSTRACT

IT SPECIALISTS TRAINING, QUALITY OF IT SPECIALISTS TRAINING, IT SPECIALIST COMPETENCIES, PRACTICE-ORIENTED TRAINING

The article describes the experience of IT specialists training at VSTU. The relevance and demand for specialists in this field on the labor market, the importance of university participation in international educational projects and programs are noted. The directions of improving the quality of training IT specialists were identified: cooperation with employers at all stages of the educational process, joint training laboratories development, using of a project and problem-oriented approach in training, remote services for organizing software development, advanced learning of a foreign language, the learning path taking into account current trends in education and labor market needs.

АННОТАЦИЯ

ПОДГОТОВКА ИТ-СПЕЦИАЛИСТОВ, КАЧЕСТВО ПОДГОТОВКИ ИТ-СПЕЦИАЛИСТОВ, КОМПЕТЕНЦИИ ИТ-СПЕЦИАЛИСТА, ПРАКТИКО-ОРИЕНТИРОВАННОЕ ОБУЧЕНИЕ

В статье описывается опыт подготовки ИТ-специалистов в ВГТУ. Отмечается актуальность и востребованность специалистов данной сферы на рынке труда, важность участия университета в международных образовательных проектах и программах. Выявлены направления повышения качества подготовки ИТ-специалистов: сотрудничество с работодателями на всех стадиях учебного процесса, создание совместных учебных лабораторий, использование проектного и проблемно-ориентированного подходом в обучении, использование удаленных сервисов для организации разработки программного обеспечения, углубленное изучение иностранного языка, формирование траектории обучения с учетом современных тенденций в образовании и потребностей рынка труда.

The IT industry plays one of the key roles in the Belarusian economy, it has been growing rapidly over the past 10 years. According to the job search service RABOTA.TUT.BY, the demand for services, products and specialists in the field of information technology continues its growth [1]. According to the information of media portal on the IT industry in Belarus and the world <https://dev.by/> case studies, over 5 years, the share of IT professionals in the regions of Belarus grew by a third, to 11.8 %. Minsk with its educational and career opportunities remains the main center of attraction. The share of remote development that could affect the ranking of regions is small. At the same time the offices of large companies and local activities in other settlements are not so numerous as to compete for personnel with the capital of Belarus [2].

According to the data of one of the world's largest audit and consulting companies Ernst & Young (EY), in Belarus today there are more than 115 thousand specialists in the field of information and communication technologies (ICT). 85 thousand of them are directly employed in the ICT area, the rest are involved in other sectors of the economy [3].

Vitebsk State Technological University has been training specialists in the field of automation for more than 30 years. Graduates of this study programme design software and hardware automation systems and often work as software developers. Accumulating this experience, in 2013 the university launched a study programme "Information Systems and Technologies" with the qualification of a software engineer. Students acquire skills in two areas: software development using the most popular technology stacks, its integration and maintenance; design of hardware and software systems based on microprocessor technology. It's a very successful combination of competencies, as shows different robotics competitions winning by VSTU students.

A significant contribution to improving the quality of IT specialists training was made by the university's participation in the implementation of the international project "Innovative ICT Education for Socio-Economic Development" (IESED) of the Erasmus+ program. The specific objective of the project is to develop modern competences of IT specialists with the help of upgrading study programmes, improving study environment, purchasing eLearning equipment for Belarusian universities according to Bologna requirements. The project has been implemented since 2017 by an international consortium of universities, including universities in Lithuania (the project's coordinator is Alytus University of Applied Sciences), France, Great Britain and Poland, as well as leading universities in Belarus. During the internships and seminars held within this project in European universities, VSTU teachers gained great experience in collaborating and organizing the training of IT specialists in Europe.

To ensure communication with the labor market and the development of the IT specialists competencies required, the university works closely with leading software development companies. The most productive is cooperation with ones that include training laboratories. However, not all IT companies can afford such units. For small companies, VSTU provides the

opportunity to open such a laboratory in the university. Thanks to this form of cooperation, the university can use the laboratory in the educational process, improve the qualifications of teachers, and the company gets the opportunity to conduct trainings, classes and courses without attracting its production facilities and its employees.

The most successful projects in this direction implemented at VSTU are the research and development laboratory opened jointly with ITechart; educational innovation laboratory opened as a joint project with the Andersen IT company; Training and research laboratory of mechatronics and automation opened jointly with the OVEN company.

The internships that students undergo at the training laboratories of IT companies and in specialized joint laboratories allow students to develop software development skills. Such events are especially useful for adapting students to working conditions in modern companies, because the organization of work there is as close as possible to the real working conditions of the software engineer.

IT companies use a multi-stage selection of candidates for employment: an interview; training where the mentor forms an idea of the basic psychological and professional indicators of the participants; an internship, where the applicants who completed the training carry out a pilot project and finally get job proposals. Companies and the university collaborate at every stage of the selection procedure receiving mutual benefits. The university must provide the necessary level of objectivity of an assessment, select the skills and indicators most in demand on the labor market. Certification systems, performance analysis in various disciplines, analysis of work in the project, preparation of a psychological portrait, reviews of the program code are used as assessment tools.

IT companies also organize open events and lectures on various aspects of software development. To conduct master classes and lectures, we invite both speakers from IT companies and teachers from leading Belarusian and foreign universities, as well as implement student exchange programs with European universities.

When preparing an IT specialist, it is necessary to study the technologies used in software development as well as to prepare a specialist for work in a development team. In VSTU, the problem is solved by introducing project oriented approach. The project implies a software system development and a student have to apply the knowledge and skills acquired in different courses. This task can be carried out as part of classroom and independent studies of several courses. The teacher in the project training conditions needs to choose a task that will require student to demonstrate most of the skills acquired. This method of training will be especially effective if the developed software system is used in the real sector: to automate the work of the university and other organizations or as a commercial startup. It increases the motivation and responsibility of the student, and also stimulates the application of theoretical knowledge in practice.

Ongoing updating of software development technologies requires not only continuous

updating of training material, but also the development of such qualities as adaptability, self-learning ability, the ability to track trends of development tools and methods, critically evaluate them, highlighting the most promising ones. A very productive approach to teaching students in this context is coaching when the teacher becomes a coach. The trainer helps the student to achieve a professional goal by directing his or her independent search for answers to questions arising during the project work. This approach integrates perfectly with project and problem-oriented learning and is an alternative to the classical methods of independent student work.

Learning a foreign language is important for the future IT specialist, and it is necessary to develop not only the skills of reading special literature, but also speaking and conversational skills, since work in the real sector of developing software systems is most often associated with direct communication with the client. A foreign language teacher must be competent in the field of IT technology. It is also advisable to introduce survey lectures, study of sources and defense of projects in a foreign language. Within the framework of the IESED international project, VSTU and partner universities have developed courses and training materials in English, which are being tested in the educational process of the university this year.

Today, the Internet has many services for organizing software development. Their capabilities can be used to organize classroom and independent work. Along with the distance learning system of VSTU we also introduce work with other services: visual means of team work organizing (allow to add tasks to the team, track to verify their performance by each of the participants remotely); repository for storing artifacts (allows to organize a repository of work completed, which will be available from any Internet access point); version control system (verification allows to track changes in the source code that each of the project participants made, to evaluate the progress of the project and identify the difficulties students face); social networks (it is convenient to use as a general and personal chat, it is especially important that this improves the efficiency of messaging outside of class); modern code quality control systems or linters (they allow to detect flaws in a workable code automatically, and to set the verification rules yourself, this increases the efficiency of verification, which becomes difficult with a large amount of sources).

A very important task of training IT specialists is the learning path development; in VSTU, the learning path is formed on the basis of the experience of European universities, the experience of the leading developers of our partner IT companies. In this case, additional factors are taken into account: the requirements of the educational standard, which strictly regulate the certain disciplines placement in the curriculum; students' desire to start developing their own project as early as possible; the need to balance the student workload throughout the entire training period. The curriculum of the study programme "Information Systems and Technologies" implements the experience gained by the university in this direction.

VSTU develops the direction of IT specialists training, including by expanding the range

of study programmes. This year the enrollment for a new study programme "Design (virtual environment)" has been announced. The specialists will have competencies in web design, virtual reality and user interface modeling.

REFERENCE

1. Анализ рынка труда в ИТ в 1 квартале 2018 года. Режим доступа: <https://vitebsk.jobs.tut.by/article/22251>
2. ИТ в Беларуси-2018: индустрия взрослеет и впитывает всё больше «других». Режим доступа: <https://dev.by/news/it-v-belarusi-2018>
3. В Беларуси более 115 тысяч айтишников, их средняя зарплата — 1800 долларов. Режим доступа: <https://nn.by/?c=ar&i=195807&lang=ru>