FORMING TECHNICAL COMPETENCE IN FUTURE SPECIALISTS IN AUTOMOTIVE INDUSTRY AT TECHNICAL COLLEGES: INTERNATIONAL EXPERIENCE

ABSTRACT

The article considers and analyzes international experience in the formation of technical competence of future specialists in automotive industry at educational institutions of Poland, Great Britain, the USA and Finland. It has been found out that Polish educational institutions regularly cooperate with potential employers (car services, motor transport establishments and organizations) to improve professional and practical training of future qualified professionals. Nevertheless, Polish educational system has a shortage of qualified teachers who can effectively explain the problems associated with personal and social competencies, modern technologies and solutions used in automotive industry. The specifics of qualifications related to the profession of a car mechanic in educational institutions of the UK, as well as opportunities for cooperation with potential employers, who can observe the formation of knowledge, skills and abilities of future mechanics in the process of their professional training, have been defined. Most of the requirements that employers have for a future skilled worker are related to the knowledge of car technology, fluency in computer equipment and availability of driver’s license for the category of vehicles that are to be served by the worker. It has been stated that technical colleges are well provided with educational and methodological support (buildings equipped with the latest machinery for training (car diagnostics and stands for repairs)). The peculiarities of the educational process organization (curricula that are constantly adjusted to meet changes in the industry, materials for the preparation of methods of work, which are usually compiled during practical classes on the diagnosis of real cars) have been highlighted. In American colleges, much attention is paid to the competence and practical work of the teaching staff. The possibilities of postgraduate employment after studying at Finnish colleges (companies specializing in the sale, maintenance and repair of cars, gas stations and private repair shops) have been outlined. Graduates of automotive colleges are taught to work with both old and new equipment. After obtaining a certificate of training, students can study engineering at any university of applied sciences. Common and distinctive features of future automotive specialists’ technical competence formation in these countries have been highlighted.

Keywords: training, specialist in automotive industry, car mechanic, college, technical competence, educational and methodical support.
Польща регулярно співпрацює з потенційними роботодавцями (автомобільними сервісами, автотранспортними установами та організаціями) для підвищення професійно-практичної підготовки майбутніх кваліфікованих фахівців. Водночас полягає система освіти має певний дефіцит кваліфікованих педагогічних кадрів, які б могли ефективно пояснювати проблеми, пов'язані з особистісними та соціальними компетентностями, а також сучасними технологіями автотранспортної галузі. Уточнено особливості кваліфікації автомеханіка в закладах освіти Великобританії, а також можливості співпраці з потенційними роботодавцями, які можуть в будь-який момент підготовки спостерігати за формуванням знань, умінь та навичок майбутнього механіка. Основні вимоги роботодавців до майбутнього кваліфікованого робітника – це знання технології автомобілів, вільне володіння комп'ютерною технікою та відповідне посівідження тієї категорії транспортних засобів, які будуть ним обслуговуватися. Показано високий рівень навчально-методичного забезпечення технічних коледжів США (призначені, обладнані новітньою апаратуру для підготовки кваліфікованих кадрів, засоби діагностики автомобілів та станції для проведення ремонтних робіт), з'ясовано особливості організації освітнього процесу (постійне коригування навчальних планів у відповідності зі змінами в промисловості; складання методик роботи на основі матеріалів, зібраних на практичних заняттях з діагностики реальних автомобілів). У коледжах США велика увага приділяється рівню компетентності та практичній роботі викладацького складу. Висвітлено можливості післядипломного працевлаштування фахівців автотранспортного профілю після навчання в коледжах Фінляндії (у компаніях, які спеціалізуються на продажі, обслуговуванні та ремонту автомобілів, заправних станціях і приватних ремонтних мастерствах). Випускники автотранспортних коледжів навчають працювати з технікою як старого, так і нового зразка. Виокремлено спільні та відмінні риси процесу формування технічної компетентності майбутніх фахівців автотранспортного профілю у цих країнах.

Ключові слова: професійна підготовка, фахівець автотранспортної галузі, автомобіліст, коледж, технічна компетентність, навчально-методичне забезпечення.

INTRODUCTION
Under the conditions of modern scientific and technological progress, educational institutions face the task of training a specialist who would meet the needs of today’s society and have a high level of technical competence. Depending on the economic situation, different countries have their own characteristics of training and retraining of automotive industry professionals, peculiar to their position in the global economic market. This necessitates the study of international experience in the formation of technical competence of future professionals in automotive industry at technical colleges to outline the possibility of introducing positive experience into the learning process of Ukrainian educational institutions.

THE AIM OF THE STUDY
The study is aimed at consideration and analysis of the international experience in the formation of technical competence of future specialists in automotive industry at technical colleges of Poland, the USA, the UK, and Finland in order to identify their common and distinctive features.

THEORETICAL FRAMEWORK AND RESEARCH METHODS
Researchers such as A. Beshley, N. Dranivsky, V. Galaychuk, P. Kostyuk, V. Kuras, Yu. Porokhovsky, O. Voltrikh, and others studied the formation of technical
competence of automotive industry specialists at technical colleges. They, in particular, considered general methodological issues regarding the application of innovative approaches in the formation of professional competence of future automotive industry specialists as well as the problem of training specialists in the field of motor transportation organization.

To achieve this goal, the following research methods have been used: analysis of specialized literature for the study of international experience in the formation of technical competence of future automotive industry professionals at technical colleges; generalization and comparison of the obtained data for outlining common and distinctive features.

RESULTS

We consider it necessary to start our research with the consideration of educational system of Poland. According to the Polish education system, the training of car mechanics of the first degree (technical college) lasts for three years, whereas the training of engineering mechanics (technical school) lasts for 4 years, but since 2020, it has been prolonged to 5 years. At the same time, after graduating from technical college, the graduate can take the matriculation exam, which gives the right to enter the university. Educational institutions regularly involve potential employers (automotive services, institutions and organizations working in the automotive industry), which increases the possibility of practical training for a qualified specialist. This makes it possible to bring education closer to real working conditions. There is a shortage of qualified teachers in educational institutions who can effectively explain problems related to personal and social competencies, state-of-the-art technologies and solutions in motor vehicle and repair field (Bregin, 2018).

Second and third year students can undergo vocational training that takes place in one of the following establishments:

- educational institutions, where there are didactic workshops, equipped with appropriate learning tools, instruments and devices, as well as cars, under the supervision of teachers and instructors of vocational training;
- practical training centers, which teach students of various profiles with specialized equipment and instructors of vocational training;
- car services, i.e. in real working conditions under the supervision of full-time employees.

Such ways of organizing vocational training provide real working conditions, real vehicles, defects and repairs, the organization of service work in automotive companies. They help to strengthen students’ knowledge and teach them to put their knowledge into practice (Gerland, 2009).

Representatives of spare parts companies conduct trainings for students. New training manuals and learning materials are introduced into the training programs for automotive specialists, and the knowledge of professionals who provide this training of future specialists in the field of repair and maintenance of cars and vehicles is constantly updated.

To be able to work as a car mechanic in the UK, a person must have good GCSE grades in mathematics, science, design technology and English. Potential employers can monitor the formation of technical competence of future car mechanics at any time of their training, in agreement with the management of the educational institution, which trains specialists in the automotive industry. The main means of forming technical competence is practice. Future car mechanics can undergo traineeship in the field of their professional training at the employer’s (Sidorenko, 2009). Traineeship programs consist of two parts:
the first is practical on-the-job training in the field of motion mechanics, and the second one is theoretical training. The traineeship includes training in National Vocational Qualifications (NVQ). The first level is maintenance and repair of vehicles. NVQ Level 2 presupposes service and repair of vehicles as well as the formation of functional skills in math and English. Other training programs begin with Level 3 qualification, which typically requires an entry-level qualification, such as a minimum of 4-5 GCSEs, including math and English, or an equivalent to BTEC qualifications (BTEC stands for Business and Technology Education Council – a provider of secondary school leaving qualifications and further education qualifications in England).

An alternative for students is to obtain a qualification via a special course. In the UK, there are several different qualifications in vehicle mechanics, each with its own unique basic elements. This gives students an opportunity to undergo all the necessary training to become a car mechanic.

BTEC covers vehicle management and technology. It is designed for those who hope to run a car company in future. There are two BTECs: HNC (Higher National Certificate) and HND (Higher National Diploma). HNC is the highest national certificate or the BTEC Edexcel Higher National certificate. The course includes resource management, vehicle operation financing and a specific project. This is equivalent to a qualification at the GCSE level. Obtaining this certificate allows you to proceed to obtain HND. BTEC Edexcel has a higher national diploma in vehicle management. The main modules are the same, but they are more detailed and advanced (Nikiforuk, 2018).

City & Guilds offers many different qualifications. They are adapted to different aspects of motion mechanics and are based on the level of students’ experience and knowledge. For example, the IVQ City & Guilds certificate in vehicle maintenance and repair focuses on key aspects of engine mechanics, such as the ability to use tools and standard workshop equipment, as well as the ability to recognize connection methods and materials. However, at level 2, the qualification becomes a diploma and focuses on the deeper aspects of engine mechanics, including the removal and replacement of engine components and component units, ancillary electrical installations and chassis.

However, City & Guilds offers other courses. For example, QCF Maintenance and Repair of Vehicles course gives a qualification obtained in a short period, with three different levels (depending on experience). This qualification is valuable for novice mechanics looking for a job (Zakharov, 2020).

Most of the requirements that employers have for the future skilled workers are to have knowledge of car technology, to be fluent in computer equipment and have a driver's license for the category of vehicles that are to be served (Pukalo, 2020).

The training of car mechanics in the US schools is an important element of the country’s automotive industry. Education is carried out in technical colleges. They have modern buildings equipped with the latest machinery for training qualified personnel. Training and education lasts for a year. Having a college diploma, students can easily find a high-paying job in construction, agriculture, mining, automotive, aviation or marine industries (Postolovtksy, 2012).

Classrooms and laboratories are equipped with modern machinery and latest technology. Students are divided into groups of 3 to 4 people. Each group has its own set of basic tools. Diagnostic equipment is used in the learning process as needed.

Depending on the type of system being diagnosed, the following diagnostic equipment is used: Snap On Modis; Snap On MT2500; Snap On Vantage; Snap On Bluepoint DMM; SUN 350 Engine Analyzer; SUN 450 Engine Analyzer; SPX Genisys.
Training takes place on stands and on real clients’ cars, but only equipped with the OBD-II diagnostic protocol (for the American market, these are cars produced after 1996), as well as on Chevrolet and Buick cars belonging to the college. The duration of training is 8 hours a day, 5 days a week for 9 months: 4 hours of lectures and 4 hours of practical classes a day.

Curricula are adjusted almost constantly, keeping pace with all the changes taking place in the industry. Materials for compiling methods of work are usually collected in practical classes on the diagnosis of real faulty cars. Much attention is paid to the teaching staff. Besides working on curricula all teachers are engaged in practical work (Stadniychuk, 2017).

Up to 800 students study in Laramie, Wyoming alone each year. Older people, who want to get second education, sometimes with significant work experience, also study there. Tuition is paid, so the attitude of students to learning is responsible.

College administrations provide employment assistance to students who have been educated in their colleges, and constantly monitor the further advancement of their graduates’ careers, offering refresher courses in line with changes in technology and the industry. For example, those who wish can be accepted for further training, which is paid by the sponsor at the car factories of Ford FACT, Mercedes ELITE, and BMW STEP. After training, they can stay there to work.

Car repair specialist is a very popular profession in Finland. After training, specialists can work in companies that specialize in the sale, maintenance and repair of cars. They can get a job at gas stations and private repair shops. Moreover, car repair specialists are in demand in freight delivery services. Training in a technical college for a car repair qualification lasts for 2-3 years. In the process of learning, students are presupposed to study the following courses: Principles of Vehicle Operation; Internal Design of Cars; Automotive Systems (e.g. brake systems, wheel systems and control systems); Car Maintenance and Repair; Electronics in Cars; Engine and Transmission; Basics of Work with Various Tools and Materials; Customer Service (Tkachov, 2020).

Educational institutions that train specialists in the repair of machines and mechanisms constantly monitor the development of automotive industry and adjust the curriculum accordingly so that students are aware of the updates. Therefore, technical college graduates are able to work with both old and new equipment. Students can choose the direction of their study – the sale of vehicles and components for them or the mechanics of road transport (Kankovsky, 2015).

After receiving a certificate of training, students can continue studying to be an engineer at any university of applied sciences.

CONCLUSIONS

Thus, the process of formation of technical competence of future specialists in automotive industry at technical colleges of Poland, Great Britain, the USA and Finland has been considered in the study. The results of the research make it possible to identify common and distinctive features in the formation of technical competence of future professionals in automotive industry at technical colleges.

Common features are:

1) qualitative provision of educational institutions with training and methodological support (workshops equipped with appropriate teaching aids, tools and devices, as well as vehicles for mastering practical skills in repair and maintenance), which is updated depending on market requirements;

2) a large number of programs and courses on professional and practical training of automotive industry specialists;
3) involvement of potential employers (automotive services, establishments and organizations working in automotive industry), which increases the opportunities for practical training of qualified professionals;
4) opportunity to enter and study at higher education institutions on simplified terms;
5) flexibility of training programs due to tracking the development of the automotive industry;
6) a wide range of internship programs.

Distinctive features are:
1) Poland, unlike the United Kingdom, the United States and Finland, has a shortage of qualified teachers who can effectively explain problems related to personal and social competences, state-of-the-art technologies and solutions related to motor vehicles and their repair;
2) different duration of study: from 9 months in the USA, to 5 years in Poland.

The study does not cover all aspects of the formation of technical competence of future professionals in automotive industry at technical colleges around the world. Further development of this topic involves finding ways to adopt positive experience in the formation of technical competence of future professionals in automotive industry at educational institutions of leading countries into the learning process of prevocational training in Ukraine.

REFERENCES