



COMPONENTS OF TECHNICAL EDUCATION FROM THE POINT OF VIEW OF MODERN SOCIAL REQUESTS

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Abstract: *Modern technical universities are obliged to show flexibility in the provision of educational services, since the modernization of modern enterprises is ongoing and professional employment additionally requires the rhythmic improvement of skills, skills and educational level of the employee, the permanent acquisition of other additional knowledge and skills that increase the value of the employee in the event of a corresponding need for them applying, as well as obtaining, another profession, if the employee foresees the application of his knowledge at the intersection of different fields of activity. And all this requires enabling the optimization of the provision of educational services by unifying their certain components in order to save its time and financial resources.*

1. INTRODUCTION

Increasingly, the abundance race of the humankind life by using of various technological devices is evidently put requests, in order to encourage the development of sufficient competencies in a number of completely different domains. It is no secret that the great prospects for the fullest application of personal computers and information resources are in themselves a motivational official for those who want to take a different level of enlightenment services. At modern, learning about the educational professional program, having the right to choose a number of primary subjects, often show the lust of other

disciplines of the educational propositions, which are not included in the chosen program. International educational cooperation and scientific research can greatly increase the possibility of educational quality.

2. MOTTO "NEVER TOO LATE TO LEARN"

In the Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUNG), an educational and scientific center for professional training and practice, where you can get educational services for a labor profession, such as a welder or a machine operator, has been established and is actively operating. The training of these professions takes place according to an optimized schedule, that is, it enables the provision of educational services in a convenient way for students. To master the second higher education within the university, there is a corresponding educational unit, which naturally ensures the coordination of previously achieved educational elements with the chosen one willing to study under the new educational program. The educational complex of the university includes colleges, graduates of which can continue their studies and obtain a bachelor's degree in a shortened period of 2 years. To provide an opportunity to implement own creative developments on the territory of the university, there is an Innovation Development Center [1], which became possible thanks to the international grant project 2SOFT/1.2/86 "Ro-Ua Cross-border academic development for research and innovation", which is implemented within the framework of the Joint Operational Program Romania-Ukraine 2014-2020 [1, 2].

2.1. An example of the provision of educational services, including two higher educations and two working professions

Ihor Kostyuk studied at the Department of Computerized Mechanical Engineering (KMV) of the Mechanical and Technological Faculty during 2001-2006, receiving a specialist diploma (equivalent to a master's degree).

Since 2007, Igor has been working on seismic vessels in various regions of the world. He has job at FUGRO and CGG companies as a pneumatic device mechanic (source mechanic). The work of a mechanic- engineer on pneumatic devices consists in servicing, repairing, lowering and raising all types of seismic equipment, hydraulic and pneumatic devices, compressors and compressor control systems used when working on seismic vessels (*Fig. 1*). Permanent work in repair work and a limited number of employees motivated Ihor to obtain a welder's degree within his native university. After that, he also acquired the profession of electrocar operator, which optimized the staffing schedule on the ship.



Fig. 1. Ihor Kostyuk on the background of a seismic vessel

Since his life motto is "It's never too late to learn", and at the same time the company's management gladly accepted such a motto, therefore Ihor received a second higher education within the walls of the University of Oil and Gas at the Faculty of Geophysics during 2006-2008.

2.2. An example of a college graduate who obtained a bachelor's degree in 2 years, and then entered a master's degree and completed it, receiving a diploma with honors

Andrii Bukhalo is a graduate of the mechanical college of VPTU-21, which is part of the educational complex of the University of Oil and Gas, and currently holds a master's degree in "Computerized and robotic engineering technologies". Since 2018, Andriy has been an employee of one of the most famous companies in Ukraine that produces children's toys. His current occupation is designing toys based on 3D modeling, using application software packages, which he was trained to use in the university environment (Fig. 2). Students of the Department of Computerized Mechanical Engineering get acquainted with 3D graphics application starting from the first year and continue to intensively apply and improve their skills throughout the entire bachelor's and master's courses.

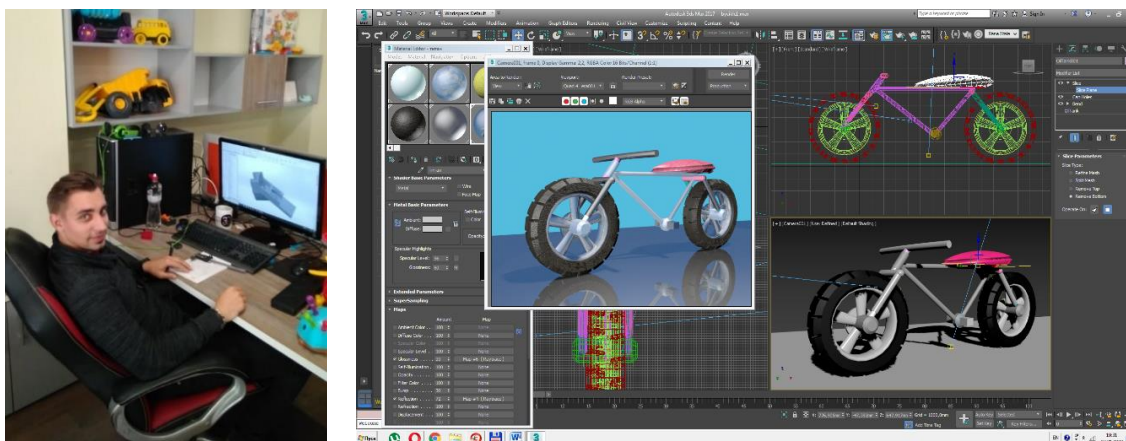


Fig. 2. Andrii Bukhalo at his workplace (2020), on the right is a screenshot from one of the educational laboratory works, which were performed in the environment of 3-dimensional graphics

2.3. An example of using the capabilities of the RoUa Innovation Development Center

One of the examples of the implementation of creative technical ideas is the active use of 3-dimensional graphics, with the subsequent implementation of the completed project using the equipment of the Center for Innovative Development (*Fig. 3*) [1], [3].

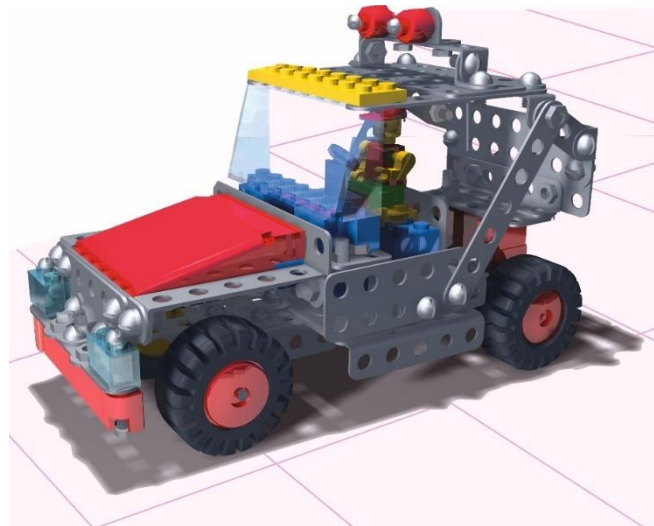


Fig. 3. A model of an innovative children's constructor, which is proposed to be developed using the equipment of the Center for Innovative

2.4. An example of receiving higher technical education in parallel under two educational and professional programs

In 2021, Bohdan Wynnychuk received a master's degree in "Computerized and robotic engineering technologies" from the University of Oil and Gas and a diploma from the Faculty of Mechanics and Robotics issued by the Krakow Academy of Mining and Metallurgy. A bilateral study agreement between two educational institutions makes it possible to receive double master's level educational services in 1.5 years (*Fig. 4*).

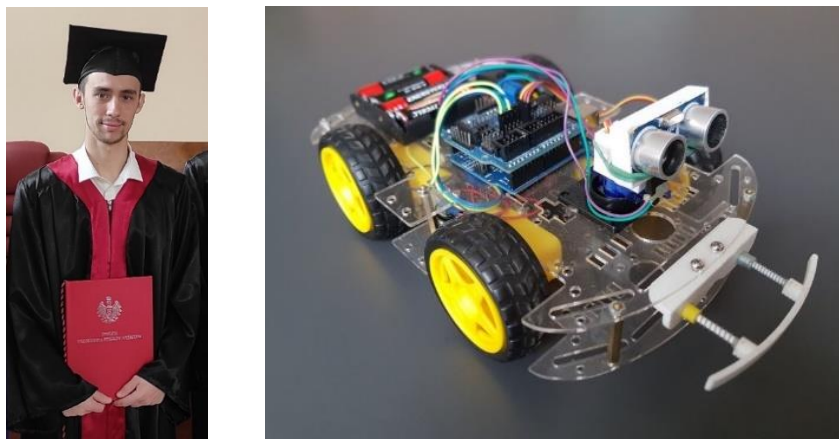


Fig. 4. Bohdan Vinnychuk with a master's degree from AGH, on the right is a robot cart designed by him and manufactured at IFNTUNG. (photo 2021)

2.5. An example of obtaining a master's degree from the Institute of Engineering Mechanics as a second higher education diploma and an internship university certificate

Iuliia Medvid - received a master's degree in the specialty "Computerized and robotic technologies of engineering technologies " in 2020, having a previous master's degree in the specialty "Finance". The duration of study was 2.5 years. In 2022, the 1st category engineer of the Department of Computerized Mechanical Engineering Iuliia Medvid completed a 180-hour internship at the Technical University of Cluj-Napoca, North University Center of Baia Mare (Fig. 5).



Fig. 5. Certificate given to Iuliia Medvid that she completed an internship at the Technical University of Cluj-Napoca, North University Center of Baia Mare

3. INDUSTRIAL PRACTICE AND PROFESSIONAL TRAINING

Production of projects "in iron" is an optional but desirable element of the educational technical program. It indicates the level of engineering training and is a certain marker of professional implementation. To solve such issues, the means of subtractive and additive machining technology are available in the center of innovative development, as well as directly in the scientific and educational laboratory base of the department of Computerized Mechanical Engineering [1, 4]. An example of a combination of the design and manufacturing process is the robot arm (Fig. 6). It should be noted that the educational professional program "Engineering of mechatronic systems" is actually an additional bonus provided by the department of computerized mechanical engineering, in addition to the Educational Professional Program "Applied Mechanics".

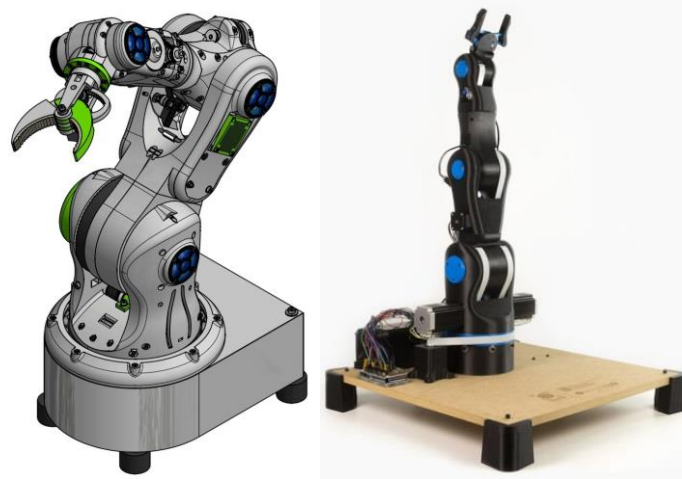


Fig. 6. 3D printed robot arm (3D model and real robot)

Important is not only the practical implementation of student projects, but also their design and research novelty. Indicative from this point of view is the thesis of the graduate of 2021 - master's student Mark Penderetskyi, which presents the development of an ultra-light cycloidal gearbox for a four-legged mini-robot [5].

4. AN EXAMPLE OF PROMOTING THE OPPORTUNITIES OF THE EDUCATIONAL AND SCIENTIFIC CENTER FOR PROFESSIONAL TRAINING AND PRACTICE

This center includes a metalworking workshop, i.e. it has metal cutting machines, welding equipment and plasma cutting machines at its disposal (*Fig.7*).

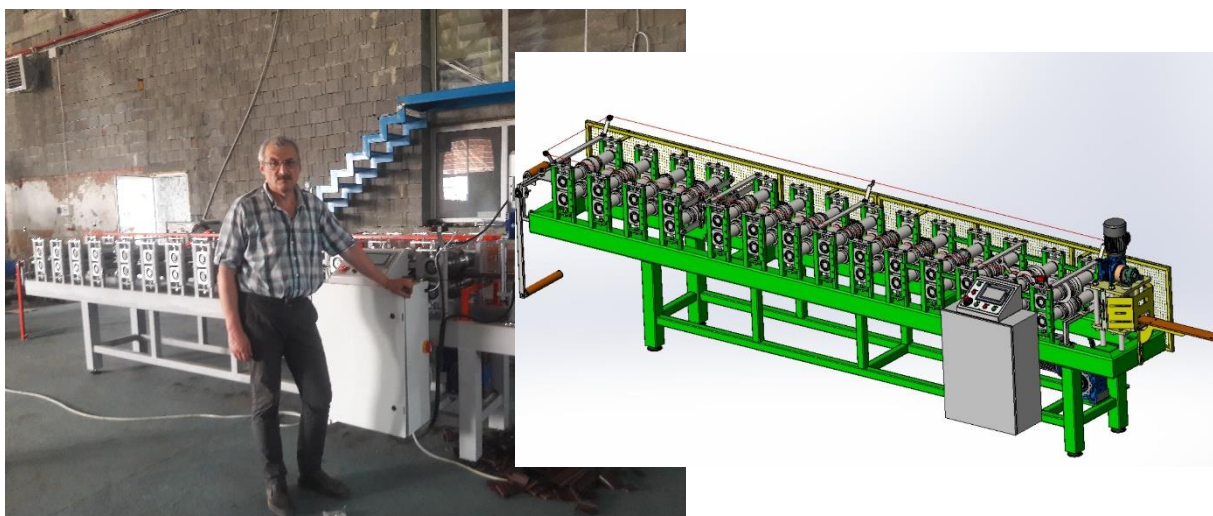


Fig. 7. Director of the center, Professor Anatory Panchuk of the KMV against the background of the designed and manufactured automatic line (right a computer model of the line)

The KMV department (students, graduates and teachers) participates in the development and production of modern industrial equipment. In particular, in 2021, a project was developed and its production started on the basis of the Educational and Scientific Center of Professional Training and Practice IFNTUNG - a batch of automatic lines for the production of a rack profile (Fig. 7).

5. CONCLUSIONS

In modern technical education, specialized software applications, specialized algorithmic languages, familiarization, production and pre-diploma practices are widely used, which are included in educational programs, but real professional employment additionally requires:

- ✓ rhythmic improvement of skills, skills and educational level of the employee;
- ✓ from time to time acquisition of other additional knowledge and skills that increase the value of the employee in the event of the corresponding need for their application;
- ✓ obtaining another profession, if the employee foresees the application of his knowledge at the intersection of different fields of activity;
- ✓ enabling the optimization of the provision of educational services by unifying their certain components in order to save its time and financial resources;
- ✓ effective practical training in real production conditions.

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