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ВИКОРИСТАННЯ ФАБЛАБ ЛАБОРАТОРІЇ ЯК НАВЧАЛЬНОЇ ПЛАТФОРМИ ДЛЯ ОСВОЄННЯ НАВИЧОК ЦИФРОВОГО ВИРОБНИЦТВА ТА ПІДПРИЄМНИЦТВА ІНОЗЕМНИМИ СТУДЕНТАМИ

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FABLAB LABORATORY AS A TRAINING PLATFORM FOR DEVELOPING FOREIGN STUDENTS' DIGITAL PRODUCTION AND ENTREPRENEURIAL SKILLS

Fablabs became very popular around the world, contribute significantly to innovations' development, provide entrepreneurs with the access to technology for developing prototypes.

By searching for “fablab creations” in one’s preferred search engine and one discovers images of anything from clothes to replacement parts for broken equipment, from guns to farming equipment, from prosthetic limbs to furniture, from houses to robots to new 3D printing machines. Companies use fablabs to create prototypes of new ideas.

In 2018 within the Erasmus+ programme of the European Union a project “Development of a network infrastructure for youth innovation entrepreneurship support on FabLab platforms” as been launched. The coordinator of the international FABLAB project was the Buckinghamshire New University (UK). The goal of the

FABLAB project is to create conditions for the development of innovations and engineering creativity, to improve students' employment through the university interaction, business and industry based on fablabs. For the educational institution, fablab is an integral part of the innovative infrastructure, [1].

The FabLab TNTU is a free workspace for students and junior researchers. Its primary challenge is to provide students the opportunity to realize their technical and creative ideas. There are 5 well-skilled experts and plenty of modern equipment, which give opportunity to create almost anything.

The FabLab at TNTU is equipped, according to the requirements of the world Fab Foundation association, by two 3D printers, laser cutter, CNC milling machines, 3D scanner, CAD/CAM computer stations, as well as Arduino electronic prototyping kits.

The FabLab TNTU was created to set up the interaction between the university and industrial enterprises; stimulate youth entrepreneurship; improve the quality of education; teach graduate and post-graduate students, and creative youth from Ternopil the engineering fundamentals of 3D modeling and computer-aided design, prototyping and 3D printing, the theory of inventive tasks solving, innovative marketing and project management; retrain teachers in the field of 3D modeling and 3D printing and prototyping, [1].

Participants of the FABLAB educational program are trained on the principle of creating their own innovative product, including the stage of its physical model or prototype development.

During the short time of the fablab existence, students and staff at the university have already been able to develop 2D and 3D models of unique equipment and to manufacture prototypes with complex geometry in the form of 3D printing.

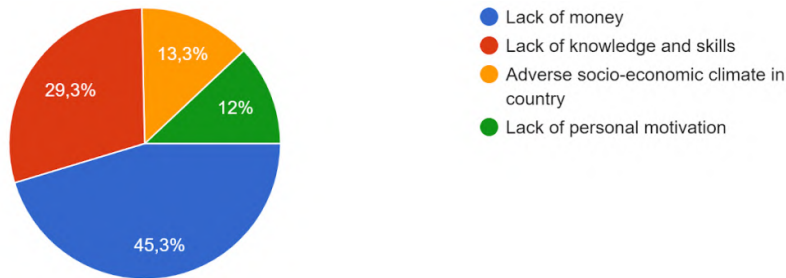
An important feature of creating an innovative product is that a significant part of its preparation can be carried out by distance learning, using both the developed within the FABLAB project methodological materials and training materials available in the worldwide FabLab network.

A dynamic map of innovative laboratories (Borghuis, <https://mapall.space/>) indicates 1114 active fablabs in the world now. There are above 225 FabLabs in the United States; in Europe, France is leading with 216 fablabs, above 190 ones operate in Italy, 66 – in Spain, 60 – in Germany, 39 – in the Netherlands, 16 – in Poland, 49 – in African countries. Fablab-based learning allows students to realize their entrepreneurial potential in any country of the world in the future.

In order to identify the interest of foreign students in studying entrepreneurship on the basis of Fablab TNTU, the survey was conducted. It aimed to identify opinions of foreign students studying at TNTU regarding entrepreneurial activities also. This survey is a part of the EU Erasmus + project of establishing Innovation Laboratory "FabLab TNTU" with the Buckinghamshire New University (UK) as its coordinator. Most of the respondents were students of 1-3 grades and came to study in Ukraine from more than twenty countries in Africa (including Nigeria, Ghana, Egypt, Zimbabwe) and Asia.

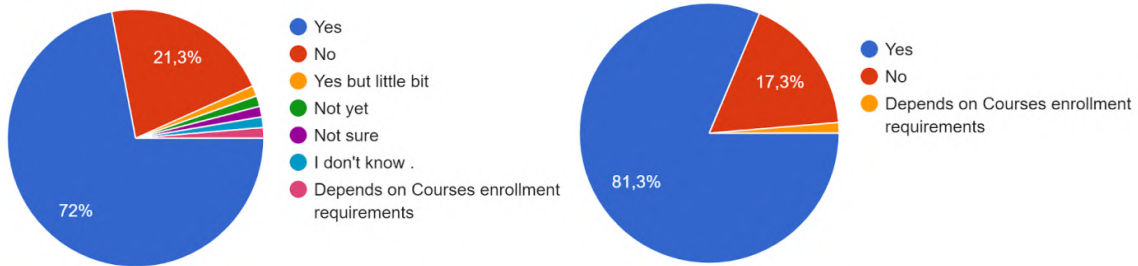
The research results testify that 17% of respondents have already had an experience with running their own business; 40% of them believe that they would open their own businesses in the nearest future. However, the main obstacles to starting own business were identified as the lack of funds (45%) and insufficient self-motivation (12%), Pic.1.

Almost one third of the respondents has indicated that they are lack of knowledge and skills which are necessary to start their own business. More than 70% of students (Pic.2a) who gave their answers would agree to take relevant Fablab courses and acquire theoretical knowledge and practical skills by taking



Pic. 1 – Survey results: Which of the below factors is the major obstacle that prevents you from establishing your own business?

the following university’s courses: innovative business ideas research and implementation; project management; development and formation of financial business model; marketing research of consumer behavior, commercialization of innovation. An interesting fact is that 80% of respondents (Pic2b) are willing to gain practical skills in the basics of digital production, in particular creation of 2D and 3D models, 3D printing, scanning, laser cutting, processing on CNC machines.



a)

b)

Pic. 2 – Survey results: a) Would you like to gain and further develop theoretical knowledge and practical entrepreneurial skills necessary to start up your own business by taking the university's courses?: b) Would you like to gain and further develop practical skills in working with modern digital technologies necessary for starting up your own business by taking the university's courses?

The research results testify that there is a significant demand for theoretical and practical knowledge of independent business organization using modern digital technologies among foreign students at TNTU. Creative laboratories on the Fablab platform are not only centers for the formation of innovative ideas, but also for students' self-education and practical knowledge of the advanced technologies.

Reference:

1) Tetiana Vitenko, Nataliia Marynenko, Valeriy Lazaryuk, Volodymyr Shanaida, The introduction of FabLab platforms as determinant of the Ukraine's economy innovative development. Business Risk in Changing Dynamics of Global Village 2: monograph / Ed. by Nataliia Marynenko, Pradeep Kumar, Iryna Kramar. Publishing House of University of Applied Sciences in Nysa, 2019, pp. 448-464.

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РОЛЬ ЕЛЕКТРОННИХ НАВЧАЛЬНИХ КУРСІВ В ОСВІТНЬОМУ ПРОЦЕСІ ПІДЧАС ПАНДЕМІЇ

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THE ROLE OF ELECTRONIC TRAINING COURSES IN THE EDUCATIONAL PROCESS DURING A PANDEMIC

Сучасна система вищої освіти в Україні перебуває в стані кардинальних змін, зумовлених пандемією COVID-19, яка сколихнула увесь світ.

Виклики сьогодення призводять до того, що система освіти зазнає змін, внаслідок внесення корективів в освітній процес, що зумовлює пошук нових ідей, зміну цінностей та пріоритетів. Попри це все, головним завданням є підготовка висококваліфікованого спеціаліста, який зможе працювати у різних умовах, що будуть диктуватись часом.

Для реалізації якісної підготовки фахівців в ТНТУ вже впродовж багатьох років використовують електронні навчальні курси (ЕНК), які є складовим елементом освітньої системи. Особливо актуальним використання ЕНК в освітньому процесі є під час дистанційного навчання, внаслідок умов,