

BENCHMARK STUDY ON OPTIMAL STRATEGIES FOR FOSTERING STEAM SKILLS IN ENTREPRENEURIAL EDUCATION

Nelli AMARFII-RAILEAN

Alecu Russo Balti State University, Republic of Moldova

ORCID: <https://orcid.org/0000-0001-5216-6>

Email: amarfii.nelli@usarb.md

Abstract: *Currently, in the context of multiple challenges and operating in a constantly changing environment, higher education institutions must adapt to new changes by reinventing new methods of activity and a new management model focused on establishing new competencies among students - the STEAM competencies, which offer the possibility to shape competent and creative young people capable of easily adapting to the new context.*

In the evolving landscape of education, universities play a pivotal role in shaping future professionals. As such, the adoption and design of innovative Science, Technology, Engineering, Arts, and Mathematics (STEAM) curriculums has become increasingly crucial. These curriculums offer an integrated approach to learning, fostering creativity, critical thinking, and interdisciplinary skills among students, thereby equipping them for a rapidly changing work environment. Furthermore, the increased need for adaptability of higher education institutions is emphasized by a new paradigm of education - postmodern education, an education that stimulates and maximizes the human potential of educational actors, as well as clarifying the need to establish new competencies among students through its fundamental elements: e-learning, e-tutoring, etc. This study represents a scientific exploration aimed at elucidating the role and undeniable contribution of STEAM competencies in higher education, competencies that are extremely necessary for educational actors in the era of postmodern education. Furthermore, the research carried out has allowed us to review the most successful national, regional, and international practices in implementing STEAM skills in higher education, on the one hand, and to clarify the most relevant practices implemented by the major university centers in the EU in integrating STEAM competencies into universities.

Another aspect of the research was directed towards analyzing the Moldovan system of higher education, with the elucidation of the need to establish STEAM competencies in entrepreneurial education, a study that focused on the Sustainable Development Goals.

Keywords: *STEAM skills, entrepreneurial education, sustainability, innovation.*

INTRODUCTION

The dynamism and turbulence that characterize the activity environment of higher education institutions require the implementation of safe and concrete measures to achieve competitiveness and sustainability through the valorization of human potential, in the context of innovative changes that occur daily and affect the activity of universities. The necessity for higher education institutions to be competitive and sustainable derives from the increasing competitive pressure and the need to align with international standards, in order to attract students and cope with the new challenges of postmodern education. The foundation of STEAM competencies within higher education institutions becomes a necessity for universities, as well as a safe path to success, competitiveness, and sustainability. Thus, sustainability in higher education institutions must be cultivated at a rapid pace, ensuring the promotion of economic, social, and environmental equity, through the prism of the new competencies consolidated by the principal educational actors - students.

Higher education institutions are the "artisans of new visions", they are the institutions that must inspire, create, and plant correct visions based on balance, fairness, and strategic visions for the development of society [1]. Thus, the need to establish STEAM competencies among students must be cultivated from the university benches, in order to raise awareness of the need to be concerned not only with material and financial results, to ensure only economic concerns, but also with social equity, alongside environmental concerns, which will allow the formation of competent, creative, and multidimensionally developed young people, capable of adapting to the new context.

Education STEAM is a new type of education that involves the introduction of new IT technologies into the educational process, the reorganization of the course unit curriculum in order to introduce interactive teaching methods, which include the use of new technologies and platforms, the introduction of content that would help to form responsible

students through the development of STEAM competencies, which focus on developing natural curiosity among students, independent thinking, as well as curricular integration of innovations and creativity development [2]. At the same time, STEAM competencies are derived from the new environment in which higher education institutions operate, which require the training of young people capable of solving real-life problems and integrating into society by exhibiting responsible behavior.

The need for STEAM competencies stems from the changes that have affected the higher education system in the Republic of Moldova. Analyzing the "Education 2030" strategy, we can mention that it is based on the National Development Strategy "Moldova - 2030", highlighting sustainable development objectives based on four pillars: sustainable and inclusive economy, robust human capital, honest and efficient institutions, and a healthy environment. [3, 4].

The evolving landscape of higher education demands the incorporation of STEAM competencies for competitiveness and sustainability. These competencies address economic, social, and environmental concerns, preparing students for real-world challenges. This shift is evident in Moldova's "Education 2030" strategy, aligning with the National Development Strategy "Moldova - 2030" and its emphasis on sustainable development.

EXPERIMENTAL

The primary objective of this study was to evaluate the effects of an innovative STEAM education program on students' cognitive capacities pertaining to problem-solving acumen and creative thinking. The investigation also encompassed an exploration into the pedagogical practices of European universities in the realm of STEAM education. The intention was to discern exemplary models that could serve as paradigms for the development of STEAM curricula within the Moldovan education framework. The research approach involved a multifaceted strategy, which incorporated legal framework analysis and an assessment of educational strategies within the Moldovan context, particularly in relation to potential integration with the European Union's educational directives.

Methodologically, this research encompassed a comprehensive analysis of legal provisions concerning STEAM education, alongside a thorough evaluation of Moldova's educational strategies that aligned with its aspirations for European Union collaboration. Moreover, the study harnessed statistical datasets derived from both international and national contexts to substantiate its arguments. The underpinning scholarly foundation was fortified through an exhaustive review of literature within the expansive domain of STEAM education. Furthermore, the research was augmented by drawing insights from the educational practices and experiences of esteemed institutions at the forefront of STEAM education.

The research approach embraced a multidisciplinary perspective, incorporating legal, educational, and statistical facets, thereby providing a robust framework for comprehensively investigating the potentialities of implementing STEAM education principles within Moldova's academic landscape.

RESULTS

The demand for STEAM skills arises from the transformations experienced by the higher education system in the Republic of Moldova. When examining the "Education 2030" strategy, it becomes evident that this strategy is rooted in the principles outlined in the National Development Strategy "Moldova - 2030," which emphasizes sustainable development goals across four key dimensions: a sustainable and inclusive economy, a strong human capital base, transparent and effective institutions, and environmental well-being [3, 4].

According to the "Education-2030" Strategy, the strategic goal in the field of education is to provide opportunities for all citizens of the Republic of Moldova to develop the necessary competencies from the earliest age and throughout their lives, to maximize their potential both in personal and family life, as well as in professional and social life, and to adapt as easily as possible to the imperatives of the time, especially those related to sustainable development. We can see that the strategic goal of the strategy includes aspects related to sustainable development by providing access to quality education for all, thus contributing to achieving Sustainable Development Goal 4 of the "Agenda-2030".

Analyzing the mission of the Education Development Strategy for the years 2021-2030, "Education-2030" and the Implementation Program, we observe that it focuses on "drawing the most relevant and appropriate directions and actions to solve education problems to consolidate a positive image of the system in society and regain citizens' confidence in the need to strengthen and sustainably develop this sector of society." Studying the mission of the strategy, we identify its foundation on the sustainable development goals stipulated in the "Agenda-2030".

As a general vision of the Education Strategy for the years 2021-2030, "Education-2030" places human capital at the forefront, which is "the safest capital of the Republic of Moldova, towards which the country's sustainable development

policy should be oriented. The key factor in human capital formation is the education system - the main stake of the Republic of Moldova in solving the social, economic, and demographic challenges facing our country today [3].

Therefore, the need for educational institutions to reset their levers, to focus their attention on building a path towards sustainability in educational institutions, is emphasized. Breaking stereotypes, outlining commitments, identifying priorities, shaping the model of achieving sustainability is a sure step towards competitiveness and sustainability. Combining traditional methods with modern ones, changing outdated views with technological ones of the present, merging classic lessons with interactive ones, involving modern technologies in the teaching-learning-research process are initiatives based on SDGs [5, 6].

Against the background of the aforementioned, in the Republic of Moldova, a strategic vision of education is emerging that must be based on sustainable development goals. This vision is also stipulated within the National Development Strategy "Moldova 2030" [3].

The pursuit of sustainable development goals is crystallized into a series of pillars in the education sector of the Republic of Moldova (Table 1).

Table 1. Sustainability pillars of the Republic of Moldova in the education sector [3]

Pillars	Essence
PILLAR no.1 "Sustainable and inclusive economy"	Training and development of human resources for the national economy capable of ensuring the country's development; Entrepreneurial and economic education of the young generation, as well as of the entire society; Production and promotion of innovations, technologies for the national economy; Attribution of vocational-technical, environmental and higher education institutions with the status of entrepreneurial institutions.
PILLAR no.2 "Human capital and resilience"	The education system is the determinant factor in shaping human capital as a goal in itself and as a mechanism for shaping society. Promoting the concept of "quality of teachers - quality of human resources - quality of economy - quality of life" will ensure the achievement of specific objectives of this pillar in the education dimension: promoting lifelong learning; promoting learner-centered education; promoting gender equality and inclusion, ensuring the right to quality education, ensuring access to education, etc.
PILLAR no.3 "Honest and efficient institutions"	Institutions in the education system are the determinant factor in ensuring the quality and functionality of this system through: efficient democratic governance; development of organizational and educational culture; development of human, financial, material, technological, and logistical resources.
PILLAR no.4 "Healthy environment"	Within the education system, this pillar can be viewed more broadly, considering the safe, formative, inclusive, and resilient educational environment as a fundamental condition for shaping human personality.

Just as the "Education 2030" Strategy is based on the "Moldova 2030" National Development Strategy, the education system in the Republic of Moldova is securely and boldly aligned with the path of sustainable development, based on clear objectives that will help achieve efficiency, effectiveness, and competitiveness in the education system of the Republic of Moldova.

Therefore, it can be stated that the actions of universities in the field of formal education, as well as non-formal activities (extracurricular) aimed at achieving sustainability, can have a positive impact on the development of relevant skills for solving social and environmental problems. Thus, following the research conducted, we can observe that the need for the foundation of STEAM competencies is emphasized by the new changes occurring in the higher education system, which require the foundation of new competencies for students to become creative, develop their human capital, and help them integrate harmoniously into the job market.

DISCUSSION

ANALYSIS OF NATIONAL AND INTERNATIONAL CONTEXT

In order to achieve sustainability within higher education institutions, innovation represents a successful lever that will help universities in their orientation towards sustainability. According to the Director-General of WIPO, Daren Tang,

"Innovation is essential for overcoming the common challenges we face and for building a better future. The Global Innovation Index is a unique tool to guide policy-makers and businesses in developing future plans to ensure that we emerge stronger from the pandemic." [7].

In this context, the analysis of the Global Innovation Index is considered relevant. Analyzing the data for 2021, we can observe that the leader among the selected countries is the Netherlands, ranking 6th in the index, followed by Finland at 7th and Norway at 20th. On the other hand, Romania ranks 48th, followed by Ukraine at 49th and the Republic of Moldova

at 64th. Thus, it can be concluded that Moldova still has much to learn, utilize, and change in order to strengthen its position. Therefore, there is a need to stimulate the development of education, encourage creativity, and involve students in research and innovation activities that will help the country become more competitive and improve its position in the ranking. Based on the analyzed data, Figure 4 was developed, which shows the values of the Global Innovation Index for 2021 (Figure 1).

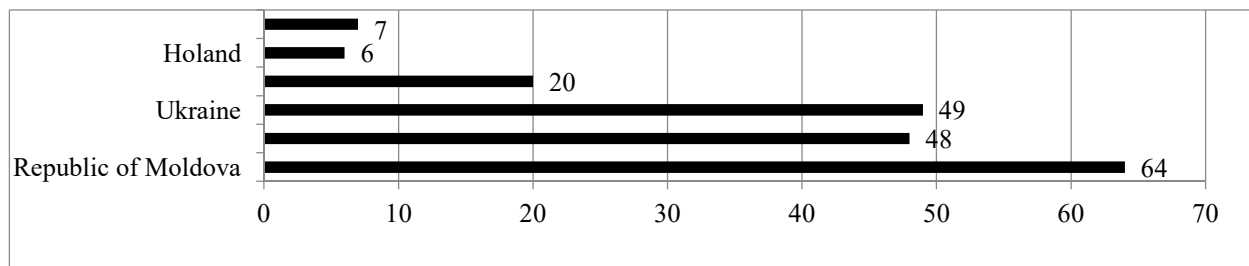


Figure 1: Global Innovation Index, 2021 [8]

Analyzing the values of the Global Innovation Index for 2021, we can observe a pressing need to establish STEAM competencies within higher education institutions, which can become a lever for the success of universities in enhancing the role of innovation. Moreover, STEAM competencies can contribute to the consolidation and generation of new innovative products, created by educational actors in higher education.

On the other hand, we consider it useful to analyze the Human Capital Index in a regional and international context for 2020, which will help us elucidate the value of the country's human capital, representing a vital factor in the formation of STEAM competencies as well as in achieving sustainability. Thus, we have presented the synthetic data in Figure 2.

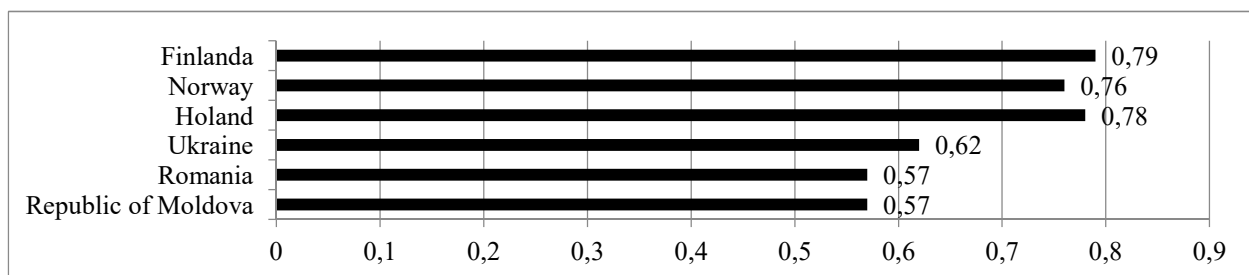


Figure 2: Human Capital Index, for the year 2020 [9]

Analyzing the Human Capital Index, we observe that our country and Romania, in 2020, recorded the same value, 0.57, the lowest values among the selected countries for analysis. At the same time, Ukraine recorded the value of 0.62, 0.05 points more than Moldova and Romania. On the other hand, EU countries such as Finland, Norway, and the Netherlands are leaders in this ranking, occupying important positions in the Human Capital Index value. The leader in our analysis is Finland, which recorded the value of 0.79, followed by the Netherlands, with a value of 0.78, and Norway with 0.76.

In conclusion, we can reiterate that Moldova, Romania, and Ukraine need to develop their human potential at the country level, consolidate their efforts to increase the country's human capital, which will positively influence the orientation towards sustainability, as well as remodeling the higher education system by anchoring it towards sustainability.

TOPICAL INITIATIVES ON EDUCATION FOR STEAM SKILLS DEVELOPMENT

Higher education institutions are the "artisans of knowledge, probes of innovation in society." Higher education institutions are meant to support innovation activities, harnessing the potential of educational actors to generate new ideas and solutions that will help society become more competitive and anchored in solving pressing social problems.

The European Union comprises developed economies anchored in innovation and sustainability. Through the Agenda 2030, the EU points to clear objectives, as well as measures to achieve them. Among the proposed dimensions by the EU are: Leadership and governance; Organizational capacity: funding, people, and incentives; Entrepreneurial teaching and learning; Preparation and support for entrepreneurs; Knowledge exchange and collaboration; Internationalized institution; Impact measurement [10, 11].

For our analysis, we have selected the Netherlands as the country to be analyzed, which represents a leading country with positions in international rankings, a country with one of the most efficient educational systems in the EU, a country with valuable university centers that can serve as best practices for the Republic of Moldova. Like many other European countries, the Netherlands struggles with the challenge of "creating value" from the excellent knowledge it produces in the higher education system. In this sense, universities in the Netherlands implement effective techniques to stimulate entrepreneurial education, generate new ideas and solutions to societal problems, and anchor themselves to the Sustainable Development Goals.

Dutch universities consider entrepreneurship and entrepreneurial skills to be crucial for translating research, and entrepreneurial education contributes to increasing economic value and, more broadly, to creating social impact. Thus, for universities in the Netherlands, creating economic, social, and cultural value from scientific knowledge obtained by educational actors represents the main mission of Dutch universities [12].

What are the policies implemented by Dutch universities to promote entrepreneurship and innovation?

Dutch universities have implemented several policies to promote entrepreneurship and innovation, including:

1. *Entrepreneurship* as an important part of the institution's strategy - Dutch university strategies focus on permanent cooperation with the business environment in the development of educational plans, curricula, skills training, and the implementation of educational results.
2. *Policies* to stimulate the valorization of scientific results by the business environment - since 2004, the Dutch government has announced that universities must carry out the "third mission" in addition to education and research, namely the valorization of obtained results. Thus, universities are encouraged to valorize scientific results and implement them in the Dutch business environment.
3. *Cooperation between Higher Education Institutions and the Business Environment* - In the Netherlands, a National Science Agenda was developed in 2004, which included representatives from the business environment who suggested that higher education institutions focus on aspects related to smart cities, circular economy, intelligent industry, sustainable food production, and energy efficiency.
4. *Introduction of entrepreneurship education at all levels* - in 2000, the Ministry of Education, Culture, and Research in the Netherlands, together with the Ministry of Economy, decided to introduce entrepreneurship education at all levels. The goal was to consolidate the entrepreneurial climate through the valorization of entrepreneurship education, which represents an interdisciplinary activity that involves cooperation with other specialized disciplines. Thus, multiple entrepreneurship centers and incubators were created with which universities collaborated. As a result, entrepreneurship education became part of the skill profile of a teacher as well as of students at all levels of study.
5. *Development of models for implementing entrepreneurship activities* within higher education institutions - Dutch higher education institutions have experimented with different approaches to adopting an efficient model for coordinating and integrating different entrepreneurship activities, and for facilitating the exchange of experience and support on an equal footing, especially in educational activities. A common approach is to anchor the entrepreneurship agenda within the institutional strategy, often in the form of a separate unit dedicated to entrepreneurship education.
6. *Creation of entrepreneurship centers* - Dutch entrepreneurship centers include 20 higher education institutions and engage them in four types of entrepreneurship education activities. Institutions commit to cooperating with each other to promote a community, exchange knowledge and good practices, stimulate and promote entrepreneurship and entrepreneurship education in higher education, and strengthen entrepreneurship research by facilitating national cooperation and promoting new research.
7. *Involvement of the business environment in all university activities* - according to a study conducted in the Dutch university environment, over 86% of universities mentioned... (the rest of the sentence is missing).
8. *Universities are centers for stimulating entrepreneurship and innovation at the local, regional, and national levels* - universities through cooperation with the business environment open innovation and technology transfer centers. A relevant example would be the creation of the Creative Industries Center by the University of Amsterdam. The center includes over 50 representatives from the business environment, local public authorities, central authorities, aimed at increasing the valorization of scientific work results in the business environment.

On the second dimension of Agenda 2030, "Organizational Capacity: Funding, People, and Incentives," Dutch higher education institutions stand out for multiple successful practices, such as [12]:

- a. *Entrepreneurial initiatives of universities are supported by various funds, sustainable financing* - a particular characteristic of the Dutch higher education system is the presence of entrepreneurial support within higher

education institutions. Most funds are provided by private sponsors and investors, representing more than 50% of the general budgets of higher education institutions interviewed for entrepreneurship support activities.

- b. *Promotion of interdisciplinary initiatives in entrepreneurial education* - both teachers and students focus on interdisciplinary research themes that provide the opportunity to integrate educational actors from various fields in order to obtain innovations and implement them in the business environment.
- c. *Increased investment in the development of scientific and teaching staff as well as that of the business environment* - the training of scientific and teaching staff is well established in the Netherlands. Thus, Dutch universities develop their talent management by offering various training opportunities in the business environment, and vice versa, staff from the business environment participate in the training courses offered by the university environment.
- d. *Offering rewards and incentives to scientific and teaching staff who support the implementation of Agenda 2030* - scientific and teaching staff are motivated by various incentives to implement the agenda and achieve the expected results.
- e. *Formation of entrepreneurial skills* - scientific and teaching staff develop entrepreneurial skills in students using various methods such as problem-based learning, visits of teachers and students to companies, inviting specialists from the business environment to lecture halls.

One of the universities selected for analysis is the Riga Business School, which is part of the Riga Technical University located in the capital of Latvia. The university was founded in 1991 by the State University of New York at Buffalo (USA) and the University of Ottawa (Canada). It was the first institution of higher education in the Baltic States to offer an MBA course in English and in the North American style, with international accreditation. All courses are taught in English and are internationally accredited [13].

The entrepreneurial approach of the Riga Business School is closely linked to regional development in the Baltic countries and is inspired by North American methods. In addition, the educational process is focused on practical projects closely related to the local economy, encouraging entrepreneurial thinking. Under this approach, Riga Business School considers digital transformation as a key factor for future leaders and as a determinant for effective teaching.

The most remarkable policies and practices applied by Riga Business School to develop the entrepreneurial approach are [13]:

1. *Entrepreneurship is the main priority of the university* - the university's vision is to educate responsible leaders to promote sustainable development in Latvia and the Baltic States. Since 2018, the university has reoriented its profile from educating business leaders in the post-Soviet context to combining IT and managerial education. The educational process focuses on providing leaders with the opportunity to understand and manage processes in a digitalized economy, which is the main mission of the Computer Science and Organizational Technology program.
2. *Cooperation between universities and the business environment* - the university organizes activities such as the "Learn Business Caravan" where high school students have the opportunity to compete for a scholarship for admission to the "Business and Administration" or "IT Technologies" program.
3. *Organization of webinars on "Leadership and Business Projects" in schools* - the university organizes webinars for school students on topics such as project management, leadership, thus attracting students to the university.
4. *Development of entrepreneurial skills* - the university proposes multiple optional course units that students can select to acquire entrepreneurial skills. A relevant example is the university's organization of practical seminars (at the end of the first year of study) where students are divided into teams, receive a problem that a company is facing, and try to generate solutions to solve this problem based on the knowledge accumulated in various course units.
5. *Promoting a digital culture* - as a factor for stimulating innovation and entrepreneurship - the university uses digital transformation for entrepreneurship in various innovative ways. Part of its mission is to prepare leaders for careers based on information technology. The use of IT infrastructure to improve teaching in the educational system has been part of the university's changes over the last decade. This is most evident in its curriculum content, which since 2018 has been increasingly oriented towards IT-based business opportunities.
6. *The university supports business centers* - the university supports the Technology Business Center of the Investment and Development Agency of Latvia (LIAA). The project promotes an innovative entrepreneurial ecosystem in Latvia through rapid prototyping of technology-intensive products and services, bringing together students and entrepreneurs. As part of this initiative, the school offers an innovation academy that prepares university students for successful implementation of digital solutions.
7. *Promoting online video lessons* - the university encourages the promotion of online video lectures by faculty from partner universities in the United States, Canada, and Norway. University students often participate in exchange programs, where they learn new skills in working with students.
8. *Intensive educational marketing development* - the university is present on various social media channels, where it promotes its educational offerings and has multiple followers.

Applied Sciences University of Tampere in Finland is one of the 24 polytechnics in Finland, and it is strongly focused on professional life, offering professionally-oriented education for the needs of the job market and conducting research

and development that supports teaching and promotes regional development [14]. In its entrepreneurial education offerings, the university applies an innovative approach to entrepreneurial education, focusing heavily on cooperative and team entrepreneurship, which is distinguished by multiple initiatives related to entrepreneurship and digitization, such as [14]:

1. The university's strategic orientation is deeply entrepreneurial - the university's general strategy includes six areas of interest, two of which encompass entrepreneurship teaching and welfare entrepreneurship. Additionally, the university integrates entrepreneurship education into all of its study programs through its Proacademy and Y-Campus programs.
2. Attractive study programs - in the field of entrepreneurship, the university has two attractive study programs: Proacademy and Y-Campus. Proacademy is a multidisciplinary entrepreneurship education program that began in 1999. It is primarily aimed at students from Business Administration and Business Information Systems programs who want a Bachelor of Business Administration degree. Proacademy students spend 2.5 years working as entrepreneurs in teams in real companies that they have specifically founded for this purpose. Each Proacademy team consists of 10 to 20 students who jointly carry out approximately 20 to 30 projects per year, developing and applying business ideas and generating real business revenue. In addition to Proacademy, in the fall of 2012, a dedicated unit called Y-Campus was established for integrating entrepreneurship education into all university study programs. Y-Campus offers entrepreneurship courses and events, as well as coaching and mentoring services, for all university study programs.
3. Effective teaching methods - in order to cultivate entrepreneurship education, the university in Finland applies modern methods focused on the use of IT technologies, problem-based learning, project-based learning, interactive teaching, group work, and team-based learning.
4. Cooperation between the university and the business environment - the university has changed its "Media and Arts" degree programs to Mediapolis, an international campus focused on content production and ICT, which brings together companies and students to work side by side in a fruitful environment for entrepreneurial thinking.
5. Developing entrepreneurial skills for all university students - the university's emphasis on entrepreneurship is reflected in the fact that approximately 20-25% of Proacademy graduates start a company within the next 5 years after completing the program, compared to less than 5% for graduates from other universities in Finland.
6. Evaluating the impact of educational education - the impact of the university's educational education is constantly evaluated through its studies. Thus, about 4 out of 5 Proacademy graduates remain closely connected to the university after graduation, contributing to the program's development through mentoring, presentations, and other forms of support.

CONCLUSIONS

The present study shows that the conceptual approach of STEAM education opts for curricular integration of content and scientific analysis of subjects from the perspective of inter-, trans- and multidisciplinary, focusing on the development of innovative and creative skills of students in problem solving and product creation through collaboration and cooperation, using modern teaching methods and integrating IT into the educational process. This approach will enable the development of creative young people capable of solving real-world problems and possessing valuable human capital that will help countries become more competitive.

Curricular integration of content begins with the planning of the teaching-learning-evaluation process that would involve an interrelation of study disciplines that allows the creation of logical connections between acquired knowledge and real life, which will contribute in unison to the formation of STEAM competences through a systemic vision.

In this sense, from the experience of the countries analyzed in our study, we consider it necessary to make multiple changes in the higher education system that would lay the foundation for STEAM competencies, such as:

- a. *Implementation of university sustainability management* – to lay the foundation for STEAM competencies, there is a need to modify the management model applied within higher education institutions by redirecting it toward the business environment, towards achieving university sustainability by including specific objectives in the strategic plan of universities regarding the attainment of university sustainability.
- b. *Fundamenting an entrepreneurial E-education* – to lay the foundation for STEAM competencies, there is a need to educate creative, competitive young people capable of solving real-world problems of enterprises. In this sense, there is a need to cultivate modern entrepreneurial education, focused on the use of IT technologies, through the use of case studies from the real life of enterprises in the educational process.
- c. *Developing entrepreneurial competencies for all university students* – to lay the foundation for STEAM competencies, it is necessary to lay the foundation for entrepreneurial competencies for all students by including entrepreneurship courses in the study program.
- d. *Applying effective teaching methods* – to cultivate entrepreneurial education, the University of Finland applies modern methods focused on the use of IT technologies, problem-based learning, project-based learning, interactive teaching, group work, team learning.
- e. *Creating Business Incubators within universities* - in order to apply theoretical knowledge in practice, students must participate in case studies, develop business projects and win them, as well as manage real businesses, as

happens at the University of Tampere, Finland. Thus, students, once they finish their studies, will be able to efficiently open and manage a business.

- f. *Modernizing learning unit curricula* - in order to form STEAM skills, there is a need to modernize the curricula of study units, to introduce new courses related to: sustainability, sustainable entrepreneurship, social entrepreneurship, Intelligent Information Technologies for Business, etc., which will offer the possibility of forming in students skills of creative thinking, problem-solving skills from real-life, and forming future responsible leaders for the future of society, who will be anchored towards achieving sustainability.
- g. *Opening attractive study programs* - attractive study programs include major concerns for the business environment, society as a whole, with a manifestation of care for achieving sustainability. Thus, in order to form students capable of efficiently managing, responsibly, and integrating harmoniously in achieving sustainability, there is a need to revise study programs and open competitive programs, such as Sustainable Entrepreneurship and Intelligent Information Technologies, which could attract young people, as well as provide them with the STEAM skills, so necessary in the context of post-modern education.

To develop STEAM competencies in the university environment, changes are necessary from top management that can be effectively transposed to all levels of university activity, faculties, and departments. Just as the EU 2030 Agenda focuses on developing entrepreneurial skills that focus on entrepreneurial thinking and harmonious integration with IT technologies that will help students become creative actors, capable after graduation of solving real-world problems, exhibiting responsible behavior toward society, and contributing to achieving sustainability.

REFERENCES

- [1] European skills agenda (28.01.2023), [online] <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en#:~:text=The%20European%20Skills%20Agenda%20is,in%20the%20European%20Green%20Deal>
- [2] Entrepreneurship and Digital Transformation at Riga Business School (08.02.2023). [online]: <https://heinnovate.eu/en/heinnovate-resources/resources/entrepreneurship-and-digital-transformation-riga-business-school>
- [3] Moldova National Strategy 2030 (01.02.2023), [online]: https://cancelaria.gov.md/sites/default/files/strategia_nationale_de_dezvoltare_moldova_2030-t.pdf
- [4] OECD Skills Studies: Supporting Entrepreneurship and Innovation in Higher Education (12.02.2023), [online]: https://heinnovate.eu/sites/default/files/oecdeu_2018_heinnovate_report_netherlands.pdf
- [5] Agheorghiesei, D.-T. et al. *Sustenabilitatea în instituțiile de învățământ superior. Bune practici în Universitatea „Alexandru Ioan Cuza” din Iași, România*. In: Statistical methods and information technologies for the analysis of socio-economic development. Ucraina: Hmelnitk, Ediția XX-a, 2020, pp. 16-28. ISBN 978-617-7572-36-6 [online] <http://tinread.usarb.md:8888/jspui/handle/123456789/1270>
- [6] Agheorghiesei, D.-T., Onofrei, M. (coord.). *Ghid de bune practici pentru implementarea în cadrul UAIC a mecanismelor moderne de evaluare a calității proceselor de predare și evaluare didactică din perspectiva principiilor sustenabilității*. Iași: Editura Universității „Alexandru Ioan Cuza” din Iași, 2019.
- [7] STEAM Skills Drive Innovation and Future Growth (12.02.2023), [online]: <https://amityglobalschoolnoida.wordpress.com/2016/04/14/steam-skills-drive-innovation-and-future-growth/>
- [8] Human Capital Index (20.02.2023). Available: <https://www.worldbank.org/en/publication/human-capital>
- [9] Moldova Strategy Education 2030 (05.02.2023), [online]: https://ipp.md/wp-content/uploads/2022/02/Strategia_Versiunea_03_2022-02-08.pdf
- [10] Entrepreneurship and Digital Transformation at Riga Business School (08.02.2023). [online]: <https://heinnovate.eu/en/heinnovate-resources/resources/entrepreneurship-and-digital-transformation-riga-business-school>
- [11] Suslenco A. *The contribution of innovative changes to the strategic development of universities in the context of achieving sustainability*. In: Lumen Proceedings, Vol.17, World LUMEN Congress/2021, Iași, Editura LUMEN, 2022, p.611-629. ISSN (on-line) 2601 – 2529. [online]: <https://proceedings.lumenpublishing.com/ojs/index.php/lumenproceedings/article/view/705/743>
- [12] OMPI, (10.02.2023), [online]: https://www.wipo.int/about-wipo/en/offices/china/news/2022/news_0040.html
- [13] Global Innovation Index, 2021 (16.02.2023), [online]: <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2022-section1-en-gii-2022-at-a-glance-global-innovation-index-2022-15th-edition.pdf>
- [14] Tampere University of Applied Sciences, Finland: Team learning and team entrepreneurship (10.02.2023), [online]: <https://heinnovate.eu/en/heinnovate-resources/resources/tampere-university-applied-sciences-finland-team-learning-and-team>

Corresponding author:

Nelli Amarfii-Railean, dr. habilitate, associate professor
Alec Russo Balti State University, Republic of Moldova
Puskin str., 38, Balti, MD3100
amarfii.nelli@usarb.md