

Technologizing youth training for entrepreneurship to fulfil sustainable development goals

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Abstract. The relevance of the article can be justified by the requirements for youth entrepreneurship training defined by sustainable development goals. In particular, these requirements are expected to promote the continuous, comprehensive and sustainable economic growth of the country, as well as full and decent employment for all. The object of the research is the technologization of youth training for entrepreneurship. The aim of the research lies in justifying and experimentally verifying the author's method of introducing pedagogical technologies in youth training for entrepreneurship in vocational education institutions. Results: the author's method of introducing pedagogical technologies is defined as a system of dependent variables, pedagogical factors and algorithms of their application. The article also presents a modelled algorithm of the simultaneous introduction of the author's technologies (motivating future specialists towards business activity, improving their financial literacy and capacity for project activity and effective self-management) in educational institutions. The effectiveness of this method has been verified during a pedagogical experiment. This experiment aimed to prove the positive dynamics in the levels of future specialists' entrepreneurship competence. Conclusions: In the short run, the author's method of introducing pedagogical technologies in youth training for entrepreneurship allows one to optimize teachers' activities (by simplifying the choice of pedagogical influence factors and isolating dependent variables), strengthen the systematicity, controllability, reproducibility and effectiveness of the author's technologies. In the medium run, it will promote the technologization of vocational education and help achieve sustainable development goals. Experimental verification of the author's method has shown a significant increase in students' levels of entrepreneurship competence. Furthermore, it has proved the synergistic effect of the systematic use of innovative forms and methods of pedagogical influence on personality.

1 Introduction

Ukraine's Sustainable Development Strategy was created under "The Sustainable Development Goals: Ukraine" national report [1, 2]. Besides, it was updated taking into account the specifics and needs of national development which should facilitate Ukraine's transition to integrated economic, social and environmental development. Emphasis is placed on youth entrepreneurship training as defined by the following sustainable development goals: decent work and economic growth (goal 8); industry, innovation and infrastructure (goal 9); sustainable consumption and production (goal 12); peace, justice and strong institutions (goal 16).

The current stage of Ukraine's market transformation shows that the country's economy is not fully suitable for

effective functioning in today's market environment. Promoting small businesses can be an effective way to create new jobs quickly, eliminate unemployment and overcome negative processes in the economy of depressed regions. Entrepreneurship can mark the beginning of a business career for young specialists, help them unleash creative potential and motivate them towards professional fulfilment and success [3]. Nowadays, entrepreneurship competence and activity of young people provide the appropriate economic and social effect which will improve living standards, reduce unemployment and create new jobs. It will also make it possible to form a middle class as the basis of socio-economic reforms and the guarantor of political and social stability of democratic development [3, 4].

Youth entrepreneurship should be viewed as a factor in increasing youth employment and a condition for creating new jobs. The development of youth entrepreneurship is one of the most important areas of economic policy. However, the process has been rather slow in Ukraine. Only 10% of young people aged between 18 and 35 are engaged in entrepreneurship [5]. In recent years, youth

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employment in the public sector has declined and outlined the shift towards the private sector. Besides, one can observe growing social tensions among young people, owing to the rising overall unemployment.

In this regard, creating favourable conditions for developing youth entrepreneurship and revealing their entrepreneurship potential can lead to a positive socio-economic effect. Thus, education technologization should become the priority. In turn, the technologization of youth entrepreneurship training involves the following: optimizing the simultaneous introduction of various pedagogical innovations and coordinating actions of all the actors in pedagogical influence on the development of competences in demand in both society and economy due to systemic, effective, supervised and repeated use of innovative pedagogical technologies. This highlights the relevance of the optimizing method of introducing pedagogical technologies as a system of dependent variables, pedagogical factors and algorithms of their application which should lead to the synergistic effect from the systematic use of innovative forms and methods of pedagogical influence on personality.

The research concept relies on the provisions of relevant international and national documents, which have identified new landmarks in global development, as well as in Ukraine's economy and education system. They are as follows: "Transforming our world: the 2030 Agenda for Sustainable Development" [6]; "The Sustainable Development Goals: Ukraine" [2]; Decree No 722/2019 of the President of Ukraine dated September 30, 2019, on Sustainable Development Goals of Ukraine for the period till 2030 [7]. These documents recognize sustainable development as the only possible way for the economy, civic society and government to increase the standard and quality of life of the population, respecting constitutional human rights and freedoms. When developing innovative pedagogical technologies and mechanisms of their introduction in educational institutions, the authors of the article have adhered to the USAID Leadership in Economic Governance Program [8], United Nations Development Program and other documents, which prioritize youth entrepreneurship in terms of the country's economic development and social harmony in society.

According to the UN, improving employment through entrepreneurship is an important part of one of the global education goals. The European Parliament and the Council of the European Union have approved the European Reference Framework of Key Competences for Lifelong Learning [9]. It defines entrepreneurship competence as "the capacity to act upon opportunities and ideas and to transform them into values for others. It is founded upon creativity, critical thinking, and problem solving, taking initiative and perseverance and the ability to work collaboratively in order to plan and manage projects that are of cultural, social or commercial value. Other basic international documents state that each country, taking into account its national specifics and individual situation, builds its education system in such a way as to harmonize social needs, available resources, internal and external factors of economic development".

A detailed review of studies by Borodiyenko et al. [8], Malykhina et al. [10], Bazyl et al. [3, 11] shows that the problem of youth entrepreneurship training has a historical, legal, socio-economic and political basis. Quite noteworthy are recent findings on the digitalization of youth entrepreneurship training [12–14]. These ideas have been taken into account when determining types and forms of pedagogical influence on students as future entrepreneurs. One should also pay particular attention to the research on an electronic portfolio [15–17] as a method of self-presentation of business ideas.

The research fellows of the Institute of Vocational Education and Training of the NAES of Ukraine have elaborated a pedagogical system of developing entrepreneurship competence in future specialists in vocational education institutions [18] and certain pedagogical technologies: enhancing business activity [11, 18]; developing entrepreneurship competence through project activity [19] and self-management [20]; improving financial literacy [21]. However, it is still crucial to analyze the results of the systematic implementation of the author's technologies in vocational education institutions.

The article *aims* to justify and experimentally verify the author's optimizing method of introducing pedagogical technologies to develop entrepreneurship competence in future specialists in vocational education institutions.

2 Theoretical background

Given the urgency of education technologization, it is essential to develop and systematically implement pedagogical technologies for developing entrepreneurship competence. The latter is seen as a system of stage-by-stage pedagogical actions (teaching, character building and personal development) aimed at rational and consistent use of forms, methods and tools of pedagogical influence to develop professionally important qualities, skills and abilities in the context of entrepreneurship. The author's pedagogical technologies for developing entrepreneurship competence [18] are expected to enhance future specialists' business activity, financial literacy, project activity and self-management. The proposed method allows one to strengthen their systematicity, controllability, reproducibility and effectiveness.

The author's technologies involve the use of similar forms and methods of work. Optimizing the introduction of pedagogical technologies, one can combine similar forms and eliminate duplication when selecting factors of pedagogical influence on changing features of a student's personality. Besides, this method also highlights students' traits common to all implemented technologies.

The technology for enhancing business activity relies on learning tasks accorded with the main entrepreneurship activities (business organization and planning; development and marketing of goods or services; uniting people who share views on the implementation of business ideas; personnel management). This technology lies in nurturing the qualities favourable for entrepreneurship by involving students in solving different situations, planning business,

creating and promoting goods, building teams and managing personnel.

The technology for developing entrepreneurship competence through project activity is aimed at the following: to incorporate project activities in professional training of future specialists; to reveal creative talents of students during independent and team work; to combine game-based forms and research work; to create conditions for a rational combination of cognitive, instructional, research, creative and other activities and economic simulations necessary for a successful business.

The technology for developing entrepreneurship competence through self-management implies a system of stage-by-stage pedagogical actions. These actions involve using forms, methods and techniques of self-management to nurture personal constructs (self-awareness, personal values, self-motivation, social knowledge about oneself, the world, the labour market and entrepreneurship, self-esteem, self-education, self-actualization and self-presentation) which one requires for a successful personal and professional career in the field of self-employment.

The technology for improving financial literacy is viewed as a set of pedagogical actions aimed at developing the following skills: keeping records of income and expenses; managing financial resources and planning future financial decisions; choosing financial instruments and creating savings to secure the future and be prepared for crises. The essence of the technology lies in improving financial literacy by using innovative teaching (e.g., case studies) and interactive methods. The content of the technology is aimed at developing and increasing levels of future specialists' financial competence based on a practice-oriented approach and social partnership, as well as the involvement of banking and financial organizations. This will enable the efficient preparation of young people for successful activities under the complex and dynamic conditions of the economy today.

A detailed analysis of the author's technologies has allowed one to identify students' common personal characteristics which should be subjected to pedagogical influence. These are axiological orientations, motivation towards success, interest in entrepreneurship; economic, legal and psychological knowledge to run a business; communication and organization skills; self-concept.

As shown by a survey of teachers participating in the all-Ukrainian experimental work (several orders of the Ministry of Education and Science of Ukraine, including No 1227 as of November 12, 2018, and No 742 as of May 28, 2019), they find it rather difficult to introduce several different technologies and methods in the activities of one educational institution simultaneously. In this regard, it was important to develop an algorithm for the simultaneous introduction of the created technologies in educational institutions (figure 1).

The above-mentioned algorithm consists of the following stages:

- 1) motivation and enhancement (motivating teaching staff by a common goal, that is, to generate young people's interest in entrepreneurship, prepare them for it and de-

velop their entrepreneurship competence; proper theoretical and practical training of teachers (pedagogical readings, methodical seminars, round-table discussions, webinars, advanced training courses); introducing mechanisms of promoting innovative teaching);

- 2) strategy building (incorporating tasks of preparing for independent entrepreneurship into strategies on educational institutions development; documenting tactical tasks defined by these strategies, updating curricula and syllabi, concluding agreements with various groups of stakeholders);
- 3) organization and coordination (creating organizational-pedagogical conditions to introduce innovations; elaborating the programme for developing entrepreneurship competence; selecting actors, forms and methods of work; organizing the coordination centre to introduce innovative pedagogical technologies for developing entrepreneurship competence in educational institutions and entrusting certain authorities to these institutions);
- 4) procedures and reflection (implementing the programme of entrepreneurship competence development (motivating students, conducting classes and activities); assessing and correcting results (tests, surveys, portfolio analysis), reflection).

This algorithm has allowed one to create a mechanism for optimizing the use of the proposed technologies for developing entrepreneurship competence in future specialists. On the one hand, it identifies the factors of pedagogical influence (areas, types and forms of work) (figure 2) common to these technologies. On the other hand, the algorithm determines the main dependent variables (values, motives, knowledge, abilities, skills, characteristics of self-concept of student's personality), which should be subjected to pedagogical influence under certain pedagogical factors.

3 Results

A stage-by-stage pedagogical experiment has been conducted at Vinnytsia Centre for Vocational Education in the Processing Industry, Lviv Higher Vocational Art School, Odesa Higher Vocational School of Trade and Food Technologies, Regional Centre for Vocational Education of Garment Production and Service Industry of Kharkiv Oblast, Cherkasy Vocational Road-Transport Lyceum, Scientific-Methodical Centre for Vocational Education in Kharkiv Oblast, Melitopol Multidisciplinary Centre for Vocational Education, Khmelnytskyi Higher Vocational School No 11, Scientific-Methodical Centre for Vocational Education and Training of Engineering Educators in Khmelnytskyi Oblast. The participants are 401 vocational education students (to identify levels of entrepreneurship competence) and 42 teachers (to carry out an expert evaluation of the author's method for optimizing simultaneous introduction of pedagogical innovations).

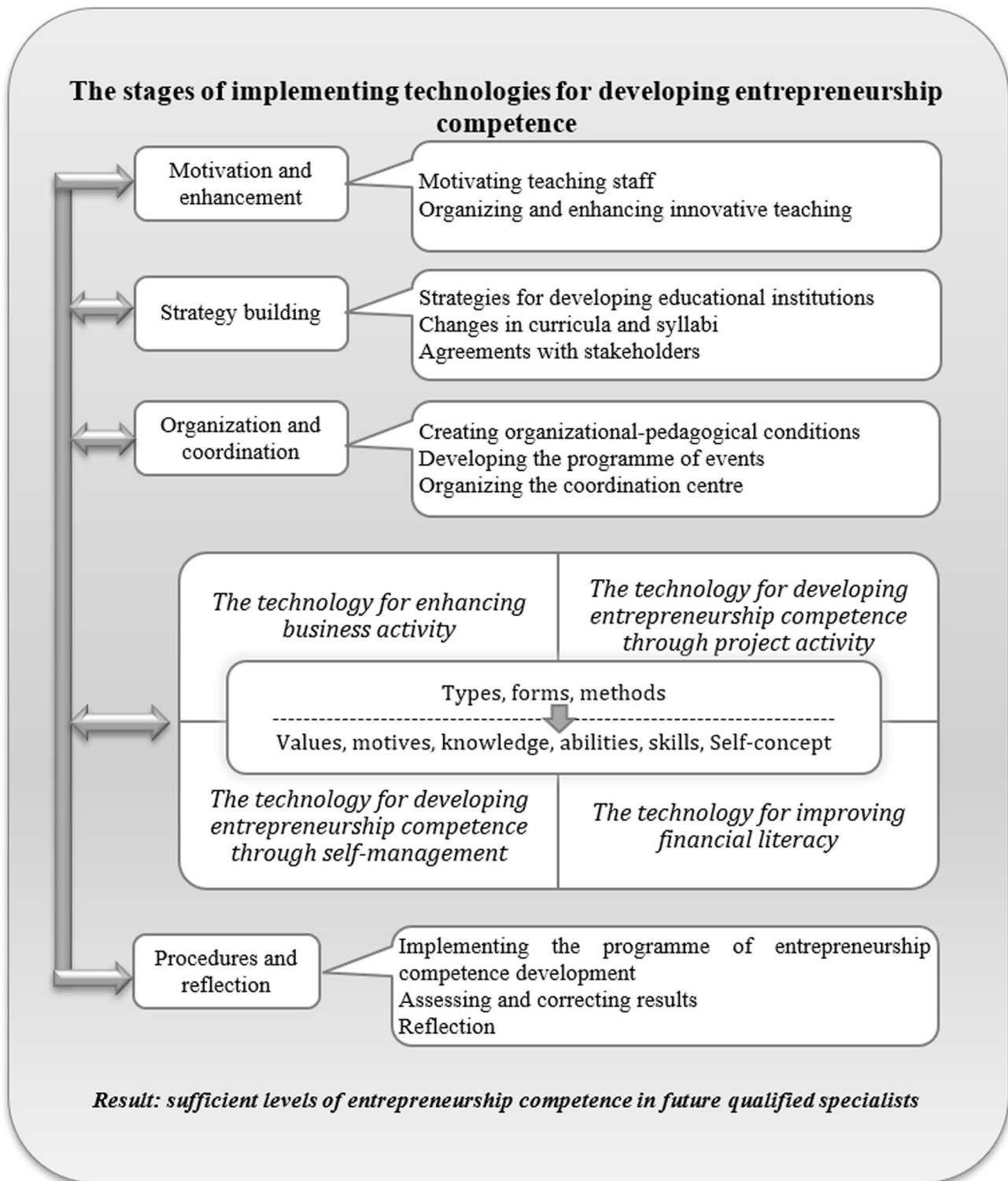


Figure 1. The algorithm of introducing technologies for developing entrepreneurship competence in vocational education institutions.

The levels of future specialists' entrepreneurship competence have served as the basis for verifying the effectiveness of youth entrepreneurship training under the following criteria:

- motivational – it is manifested through axiological orientations towards entrepreneurship, motives and aspirations to accomplish business goals, achieve personal and professional success;

- cognitive – it describes a system of theoretical and practical knowledge about entrepreneurship (creating start-ups, raising awareness of market mechanisms for entrepreneurship management, promoting employee relations ethics);
- activity-related – it depends on entrepreneurship skills (planning entrepreneurship, realizing business projects, making sound economic decisions, using rational meth-

Theoretical work

- **Classroom work:** group classes with a psychologist / a social educator; providing additional or consolidating existing information in classes in comprehensive and professional-theoretical subjects; computer science classes (the basics of e-portfolio preparation).
- **Extracurricular work:** Guest lectures, video lectures, trips, exhibitions, quizzes, discussion clubs, online courses, incubation and acceleration projects.
- **Independent work:** preparing reports, abstracts, materials for participation in discussions.

Diagnostics

- **Classroom work:** group / individual classes with a psychologist (a social educator, a classroom supervisor, including diagnostic testing).
- **Independent work:** performing diagnostic tests, chosen together with a consultant based on the results of previous tests to clarify the data on the personality development characteristics

Practical work

- **Classroom work:** psychological workshops (practical classes with teachers, psychologists, social educators, classroom supervisors).
- **Extracurricular work:** competitions for professional excellence and the best e-portfolio, self-presentation exhibitions.
- **Independent work:** performing practical tasks on the topic of the module, organizing workshops, working with e-portfolios.

Reflection/Self-development

- **Classroom work:** group / individual classes with a psychologist (a social educator, a classroom supervisor, including diagnostic testing).
- **Independent work:** performing diagnostic tests, chosen together with a consultant based on the results of previous tests to clarify the data on the personality development characteristics

Figure 2. Types and forms of entrepreneurship competence development.

ods, developing effective models of action and presenting results);

- personal – the ability to generate and implement new commercial ideas, predict results, adapt to new economic opportunities, show leadership qualities, strive for self-organization and self-development.

One can evaluate the development of entrepreneurship competence by three levels (sufficient, average, initial). Methods for evaluating entrepreneurship competence can be found on the website of the professional career laboratory of the Institute of Vocational Education and Training of the NAES of Ukraine (<https://ivet.edu.ua/labs/prof-career/opytuvannia-testuvannia>).

Pearson chi-squared test has been used to verify the obtained results. Its indicators have proved the positive dynamics in the levels of future specialists' entrepreneurship competence by all the criteria at the ascertaining and formative stages of the experiment.

A detailed analysis of dynamics in the development of entrepreneurial competence, as the result of the systemic

and controlled influence of certain experimental factors, has proved the effectiveness of pedagogical technologies for developing entrepreneurship competence in future specialists. These technologies have been systematically implemented in the educational institutions participating in the experiment.

According to the motivational criterion, the number of students with a sufficient level of entrepreneurship competence has increased by an average of 8.06%. In particular, the level of axiological orientations towards entrepreneurship has increased by 7%, the motivation towards success – by 21%, an interest in entrepreneurship – by 8.77%. Finally, the number of students with a conscious attitude towards entrepreneurship has increased by 11.17% (figure 3).

According to the cognitive criterion, the number of students with a sufficient level of entrepreneurship competence has increased by 18.89%. In particular, the indicators of students' knowledge about entrepreneurship theory have improved by 17.94%, the entrepreneurial process – by 11.95%, the legal framework of entrepreneurship – by

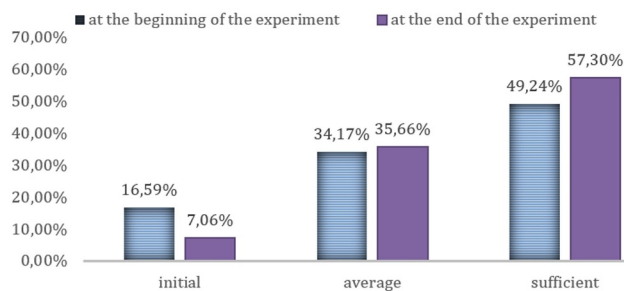


Figure 3. Levels of entrepreneurship competence by the motivational criterion.

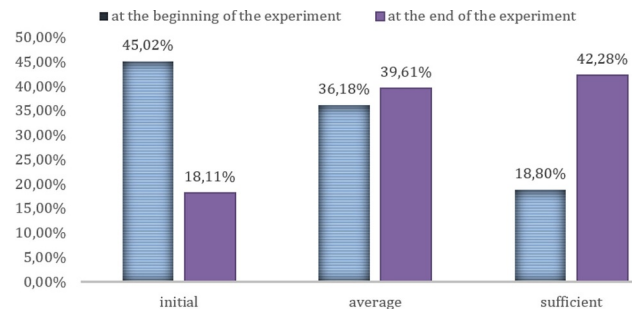


Figure 6. Levels of entrepreneurship competence by the personal criterion.

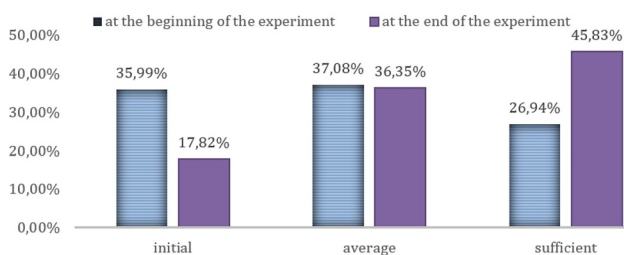


Figure 4. Levels of entrepreneurship competence by the cognitive criterion.

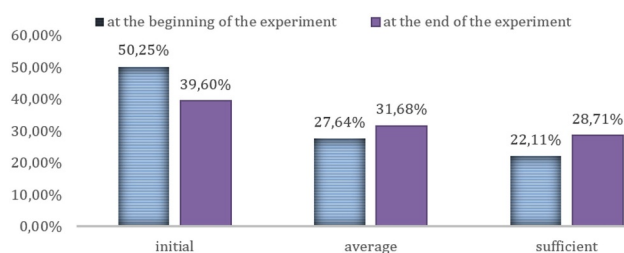


Figure 5. Levels of entrepreneurship competence by the activity-related criterion.

11.99%, the fundamentals of business management – by 33.25%, market mechanisms of entrepreneurship management – by 19.39% (figure 4).

According to the activity-related criterion, the number of students with a sufficient level of entrepreneurship competence has increased by 10.8%. In particular, students' entrepreneurship skills have improved by 20.07%, business project planning – by 14.99%, logical thinking – by 4.66%, self-presentation skills – by 6.6% (figure 5).

According to the personal criterion, the number of students with a sufficient level of entrepreneurship competence has increased by 23.48%. In particular, students' entrepreneurial thinking has improved by 18.53%, prognostic skills – by 28.45%, initiative, flexibility and ability to take reasonable risks – by 21.51%, organization and self-management skills – by 26.16% (figure 6).

At the same time, 42 teachers acted as experts, who, based on their experience of innovative teaching, evaluated the effectiveness of introducing pedagogical technologies before and after using the author's method. In doing so, they relied on the following criteria: ease of choosing

pedagogical influence factors; convenience in isolating dependent variables; systematicity, controllability and effectiveness of experimental factors influence; the presence of the synergistic effect. The evaluation was performed on a twelve-point scale (figure 7).

The expert evaluation shows that using the author's optimizing method in the institutions participating in the experiment has led to the following results. It has become possible to simplify choosing pedagogical influence factors by 38.62%, isolating dependent variables by 23.1%, improve systematicity (38.62%), controllability (51.61%) and effectiveness (25.39%) of pedagogical influence, identify the features of the synergistic effect from the simultaneous introduction of several pedagogical innovations.

4 Discussion

The authors of the article have confirmed the positive dynamics of change in all the criteria by comparing the results on entrepreneurship competence levels obtained at the ascertaining and formative stages of the experiment. In general, one can observe a significant increase in the percentage of students with a sufficient level of entrepreneurship competence. According to the motivational criterion, students' motivation towards entrepreneurship (including axiological orientations, motivation towards success, interest in entrepreneurship) has increased by an average of 8.06%. The indicators of the cognitive criterion have improved by 18.89%. These include the knowledge about entrepreneurship theory, the entrepreneurial process, the legal framework of entrepreneurship, the fundamentals of business management and, finally, market mechanisms of entrepreneurship management. The indicators of the activity-related criterion have improved by 10.8%. In particular, the respondents have demonstrated the ability to systematically study and develop qualities necessary for a successful business, create, administer and use an e-portfolio to advance a professional career; plan, present and implement business projects. The indicators of the personal criterion have improved by 23.48%. Most respondents have shown sufficient levels of the ability to generate innovative business ideas and identify possible risks, as well as prognostic, organization and self-management skills.

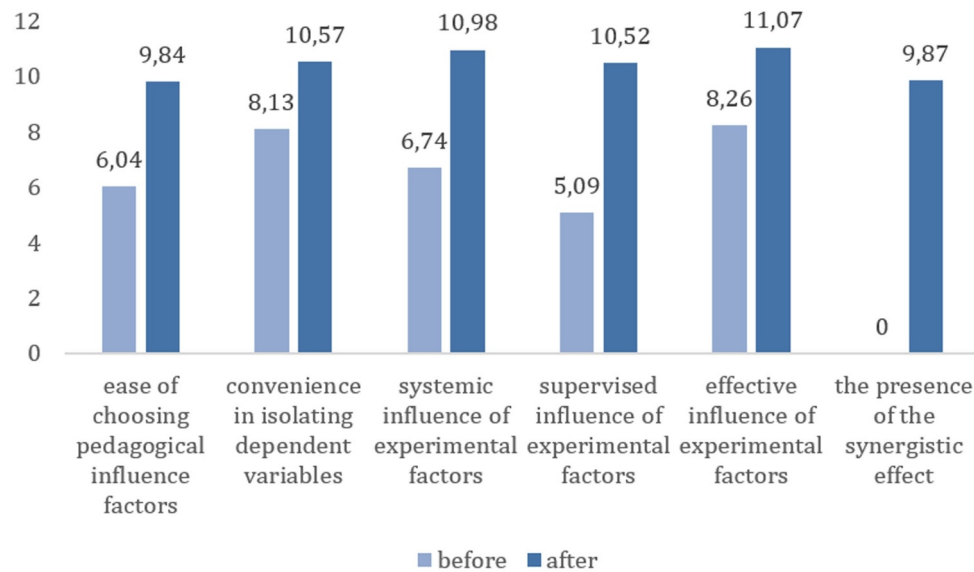


Figure 7. The effectiveness of introducing pedagogical technologies before and after using the author’s method.

A survey of teachers participating in the experiment (eight creative groups with a total of 42 respondents) proves that systematic integration of the author’s technologies for their supervised introduction in the above-mentioned educational institutions has made it possible to simplify choosing pedagogical influence factors (common types, forms and methods of work), isolate dependent variables inherent in all technologies (values, motives, knowledge, skills, personal qualities), strengthen interdisciplinary links, unite the teaching staff, boost their motivation to engage in innovative teaching, optimize the time costs, increase the levels of entrepreneurship competence in future specialists.

5 Conclusions

It is crucial to update the national system of vocational education by taking into account basic international and Ukrainian documents, conclusions and recommendations of Ukrainian researchers and practitioners that emphasize the existence of direct links between the development of entrepreneurship competence and the country’s focus on sustainable development. Besides, education technologization can help achieve sustainable development goals, since it lies in developing pedagogical innovations and implementing them in the educational process. It is possible to enhance systematicity, controllability, effectiveness and reproducibility of the author’s technologies (motivating future specialists towards business activity, improving their financial literacy and capacity for project activity and effective self-management) by using the author’s optimizing method of introducing pedagogical technologies. This method is a system of dependent variables, pedagogical factors, as well as the algorithm of their application designed to create the synergistic effect of systematic use of innovative forms and methods of pedagogical influence.

A comparative analysis of the obtained results on entrepreneurship competence levels and teacher survey at the

ascertaining and formative stages of the experiment confirm the effectiveness of the author’s method. It has allowed one to simplify choosing pedagogical influence and isolating dependent variables, optimize the time costs and motivate more students to start and run their own businesses. The proposed pedagogical innovations are expected to reduce youth unemployment, increase the percentage of the officially self-employed population, withdraw funds from the shadows and improve revenues to the state budget and, most importantly, increase the percentage of young people ready for professional careers in Ukraine.

The used method makes it possible to determine the readiness of the introduced technologies at the IRL6 level [22]. It is characterized by a team of motivated researchers, innovative pedagogical products and experimental confirmation of possible commercial prospects in the case of providing high-quality scientific-methodical support for introducing pedagogical innovations in vocational education institutions in Ukraine, especially by using the author’s optimizing method.

It is possible to confirm commercial prospects of the justified technologies and the method of their introduction by a longitudinal study on professional career development of vocational education graduates who have obtained training under the author’s programme for developing entrepreneurship competence.

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