ICHTML 2023

4th International Conference on History, Theory and Methodology of Learning

October 12-13, 2023
Kryvyi Rih, Ukraine

PROCEEDINGS

EDITORS
Serhiy Semerikov
Vita Hamaniuk
Pavlo Nechypurenko
Yaroslav Shramko

ICHTML 2023

Proceedings of the 4th International Conference on History, Theory and Methodology of Learning

Kryvyi Rih - Ukraine

October 12 - 13, 2023

Co-organized by
ACNS - Academy of Cognitive and Natural Sciences
KSPU - Kryvyi Rih State Pedagogical University

Hosted by
KSPU - Kryvyi Rih State Pedagogical University

In Cooperation with
IDE - Institute for Digitalisation of Education of the NAES of Ukraine

Edited by Serhiy Semerikov, Vita Hamaniuk, Pavlo Nechypurenko and Yaroslav Shramko

Printed in Portugal
ISBN: 978-989-758-579-1
DOI: 10.5220/0000176600003737
Depósito Legal: 526706/24

https://ichtml.org
semerikov@gmail.com

BRIEF CONTENTS

ORGANIZING COMMITTEES IV

PROGRAM COMMITTEE V

FOREWORD VII

CONTENTS IX

ORGANIZING COMMITTEES

PROGRAM CO-CHAIRS

Dr. Serhiy Semerikov, Professor of Computer Science and Educational Technology, Kryvyi Rih State Pedagogical University, Ukraine

Dr. Vita Hamaniuk, Professor of German Literature and Didactics, Kryvyi Rih State Pedagogical University, Ukraine

Dr. Pavlo Nechypurenko, Associate Professor of Chemistry Education and Educational Technology, Kryvyi Rih State Pedagogical University, Ukraine

Dr. Yaroslav Shramko, Professor of Logic and Philosophy, Kryvyi Rih State Pedagogical University, Ukraine

PROGRAM COMMITTEE

George Abuselidze, Department of Finance, Banking and Insurance, Batumi Shota Rustaveli State University, Ninoshvili street 35, Batumi, Georgia, Georgia

Svitlana Amelina, National University of Life and Environmental Sciences of Ukraine, Ukraine

Vira Andriievska, H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine

Liudmyla Bilousova, Independent researcher, Israel

Olha Bondarenko, Kryvyi Rih State Pedagogical University, Ukraine

Helena Fidlerová, Slovak University of Technology in Bratislava, Slovak Republic

Irina Georgescu, Bucharest University of Economics, Romania

Yuksel Goktas, Ataturk University, Turkey

Liudmyla Gryzun, Simon Kuznets Kharkiv National University of Economics, Ukraine

Yasemin Gulbahar, Ankara University, Turkey

Vita Hamaniuk, Kryvyi Rih state pedagogical university, Ukraine

Arnold Kiv, Ben-Gurion University of the Negev, Israel

Oleksandr Kolgatin, Simon Kuznets Kharkiv National University of Economics, Ukraine

Tetiana Kramarenko, Kryvyi Rih State Pedagogical University, Ukraine

Volodymyr Kukharenko, Kharkiv National Automobile Highway University, Ukraine

Olena Kuzminska, National University of Life and Environmental Sciences of Ukraine, Ukraine

Olena Lavrentieva, Alfred Nobel University, Ukraine

Olena Lokshyna, Institute of Pedagogy of the NAES of Ukraine, Ukraine

Iryna Mintii, Institute of Information Technologies and Learning Tools of the NAES of Ukraine, Ukraine

Olga Moreno-Fernández, University of Seville, Spain

Pavlo Nechypurenko, Kryvyi Rih State Pedagogical University, Ukraine

Yuliia Nosenko, Institute for Digitalisation of Education of the NAES of Ukraine, Ukraine

Vasyl Oleksiuk, Ternopil Volodymyr Hnatiuk National Pedagogical University, Ukraine

Kateryna Osadcha, Norwegian University of Science and Technology, Norway

Viacheslav Osadchyi, Bogdan Khmelnitsky Melitopol State Pedagogical University, Ukraine

Nataliia Ovcharenko, Kryvyi Rih State Pedagogical University, Ukraine

Ümit Özkanal, Eskişehir Osmangazi Üniversitesi, Turkey

Liubov Panchenko, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ukraine

Stamatios Papadakis, Department of Preschool Education, Faculty of Education, University of Crete, Greece, Greece

Oksana Pershukova, National Aviation University, Ukraine

Larysa Petrenko, Ivan Ziaziun Institute of Pedagogical and Adult Education of the NAES of Ukraine, Ukraine

Olha Pinchuk, Institute for Digitalisation of Education of the NAES of Ukraine, Ukraine

Nataliia Ponomarova, H. S. Skovoroda Kharkiv National Pedagogical University, Ukraine

Volodymyr Proshkin, Borys Grinchenko Kyiv University, Ukraine

Oleg Pursky, Kyiv National University of Trade and Economics, Ukraine

Serhiy Semerikov, Kryvyi Rih State Pedagogical University, Ukraine

Yevhenii Shapovalov, National Center of Junior Academy of Sciecne, Ukraine

Yaroslav Shramko, Kryvyi Rih State Pedagogical University, Ukraine

Oleksandra Sokolyuk, Institute for Digitalisation of Education of the NAES of Ukraine, Ukraine

Oleg Spirin, Institute of Information Technologies and Learning Tools of NAPS of Ukraine, Ukraine

Tetiana Vakaliuk, Zhytomyr Polytechnic State University, Ukraine

Maryna Vardanian, Kryvyi Rih State Pedagogical University, Ukraine

Vladyslav Velychko, Donbas State Pedagogical University, Ukraine

Kateryna Vlasenko, National University of "Kyiv Mohyla Academy", Ukraine

Nataliia Volkova, Alfred Nobel University, Ukraine

Yuliia Yechkalo, Kryvyi Rih National University, Ukraine

FOREWORD

The International Conference on History, Theory and Methodology of Learning (ICHTML) is a peer-reviewed international conference that covers a wide range of topics related to the history, theory, and methodology of learning. The conference is focused on exploring innovative approaches to learning and examining the theoretical underpinnings of various learning models and methodologies. The conference aims to bring together researchers, educators, and practitioners from different fields interested in understanding how people learn, how learning can be facilitated and improved, and how learning practices and theories have evolved. The conference provides a platform for sharing research findings, exchanging ideas, and discussing the latest trends and developments in the field of learning. It encourages interdisciplinary collaborations, as well as discussions on the integration of new technologies in the learning process.

ICHTML topics of interest are:

- Historical perspectives on learning and education
- Theories of learning and their applications
- Innovative teaching methodologies and approaches
- Learning technologies and their impact on education
- Learning in different contexts (formal, informal, non-formal)
- Social and cultural aspects of learning
- Assessment and evaluation of learning outcomes
- Learning and development across the lifespan
- Learning disabilities and special educational needs
- Cross-cultural perspectives on learning and education
- Philosophical perspectives on learning and education
- Pedagogical strategies and techniques for effective learning
- Teacher education and professional development
- Educational policies and their impact on learning and education
- Learning and education in the digital age
- The impact of technology on learning
- Learning analytics and big data

This volume represents the proceedings of the 4th International Conference on History, Theory and Methodology of Learning, held in Kryvyi Rih, Ukraine, on October 12-13, 2023. It comprises 20 contributed papers that were carefully peer-reviewed and selected from 27 submissions. Each submission was reviewed by at least 3, and on average 3.5, program committee members. The accepted manuscripts provide an up-to-the-minute appraisal of successful cases and delineate guidelines for prospective research.

We express our gratitude to all the scholarly authors who submitted their works and the participants who graced the occasion with their presence and interest in ICHTML as a platform for sharing their ingenious ideas. We are profoundly grateful to the program committee members for their unwavering guidance. At the same time, the peer reviewers, by offering constructive criticism, commendations, and corrections, have

tremendously contributed to the quality of the publications. We appreciate the developers of HotCRP, whose exceptional conference management system provided us with a wealth of resources, from the call for papers and reviewer invitations to handling paper submissions and communication with the authors. Lastly, we acknowledge the SCITEPRESS team's cordial and fruitful cooperation in assembling and publishing the conference proceedings.

Serhiy Semerikov
Kryvyi Rih State Pedagogical University, Ukraine

Vita Hamaniuk
Kryvyi Rih state pedagogical university, Ukraine

Pavlo Nechypurenko
Kryvyi Rih State Pedagogical University, Ukraine

Yaroslav Shramko
Kryvyi Rih State Pedagogical University, Ukraine

CONTENTS

PAPERS

FULL PAPERS

Education of Energy Engineers in the Context of Lifelong Learning 5
Ilona Batsurovska

Education for the Future in Philosophy of Professor Bogdan Suchodolski 13
Andrew M. Cwer

The Value Aspect of Student Youth Perception of Space and Time Categories 21
Svitlana P. Palamar, Natalia M. Golota, Liudmyla L. Nezhyva, Kateryna A. Brovko and Maryna S. Naumenko

Cadets' Psychological Readiness Formation Program in the National Guard of Ukraine to Use Firearms in Professional Spheres 31
Ihor O. Atamanenko, Oksana K. Kornosenko, Oksana V. Danysko and Maya S. Serhiienko

Precedent Phenomena of Culture: Translation and Linguo-Didactic Barriers and Ways of Overcoming Them 41
Olga Kanevska and Kateryna Hostra

Applying the Content-Based Instruction Approach to Vocabulary Acquisition for Students of English for Specific Purposes 50
Larysa V. Mosiyevych, Olena M. Mikhailutsa, Karina V. Belokon, Andriy V. Pozhuyev and Tetiana V. Kurbatova

International School of Young Scientists as a New Form of Professional Scientific Growth of Educational Institutions of Higher Military Education of Ukraine 61
Iryna Trubavina, Oleksandr Cherednychenko, Kyrylo Nedria, Svitlana Klimova and Kateryna Kalina

Competitiveness of National Higher Education Institutions in the International Market of Educational Services: The Case of Ukraine 73
Liudmyla Kalashnikova, Liudmyla Chernous, Olena Lakomova, Tetiana Karpenko and Olena Zavalniuk

English Teaching and Learning Strategies and Tactics for Tertiary Education 85
Alona Litvinchuk and Larysa Kupchyk

Prevention of Shopaholism in Students of Higher Education Institutions 98
Ivanna Parfanovich, Iryna Trubavina and Uliana Huzik

Inquiry-Based Learning in the Study of Chemical Disciplines by Food Technologies Students 107
Olha Hulai, Iryna Moroz and Vasylyna Shemet

Approaches to the Blended Learning Organisation 114
Iryna S. Mintii

The Use of Miro While Formation of Communicative Competence of Future Ship Engineers 122
Olena Kononova, Olena Diahyleva and Alona Yurzhenko

Pre-Service Teachers' Perceptions on Implementing the Trauma-Informed Approach in Educational Institutions 130
Tetiana Holovatenko

Usage of Satellite Navigation Technologies in Schools Around the World 138
Igor Kholoshyn, Svitlana Mantulenko, Olha Bondarenko, Olena Hanchuk and Iryna Varfolomyeyeva

Experimental Verification of Using Augmented Reality Technology for Teaching Global Reading to Preschoolers with Autism Spectrum Disorders 148
Tamila Kolomoiets, Olena Bielikova and Anna Kurienkova

A Comprehensive Framework for Assessing Scientific Research Effectiveness Among Academic and Research Staff 156
Svitlana M. Ivanova, Oleg M. Spirin, Oleksandr M. Shymon, Tetiana A. Vakaliuk, Iryna S. Mintii and Serhiy O. Semerikov

Transgressiveness, Innovation, and Readiness of the Modern Teacher for Change 163
Lyudmila L. Khoruzha, Victoria V. Zhelanova, Mariia V. Bratko, Svitlana P. Palamar and Inna V. Leontieva

The Architectural and Artistic Strategy of Ecologization as a Mental-Spatial Way of Realizing the Sustainable Development Goals 173
Vasyl M. Fedorets and Oksana V. Klochko

"Branding Theory, Design and Identity" Course Teaching Experience for Modern IT Specialists 191
Viktoriia V. Bolotina, Tetiana A. Vakaliuk, Olha R. Harbych-Moshora and Valerii V. Kontsedailo

AUTHOR INDEX 205

PAPERS

FULL PAPERS

Education of Energy Engineers in the Context of Lifelong Learning

Ilona Batsurovska[a]
Mykolayiv National Agrarian University, 9 Georgya Gongadze Str., Mykolayiv, 54020, Ukraine
batsurovska_ilona@outlook.com

Keywords: Education, Energy Engineers, Lifelong Learning.

Abstract: This article is devoted to analyzing the importance of lifelong learning for energy engineers. The problem of the insufficient number of qualified specialists in the field of energy engineering is considered, as well as the fact that the educational system cannot always meet the needs of the labour market. The paper examines opportunities for improving the education system to provide skilled workers for the energy industry, including lifelong learning. A study of energy professionals found that lifelong learners scored higher in various aspects of professional performance, such as work efficiency, creativity and innovation. The article also carries out a comparative analysis of the average annual income of energy specialists depending on the level of education. The results showed that professionals with a higher education have a significantly higher average income compared to those with only a secondary education. The influence of education on the career development of specialists and their income has been studied. In the work, a survey was conducted among specialists with higher education and specialists with secondary education who work in the field of energy. The results of the study showed that specialists with higher education have a higher average annual income and a wider range of knowledge, which is important for their career development. In addition, it was established that lifelong learning has a significant impact on improving the qualifications of specialists in the field of energy and their competitiveness in the labour market. The results of this study can be useful for managers of companies in the energy sector who plan to develop their personnel and increase the competitiveness of their company.

1 INTRODUCTION

Education is an important factor for the development of any industry, including energy engineering. In recent years, the importance of education in this field is growing, since energy is a key component of sustainable development, technological progress and competitiveness of the country as a whole. Improving the qualifications and professional development of specialists in the field of energy is important to ensure the proper level of efficiency and quality of work in this field. It is especially important to develop the education of energy engineers in the context of lifelong learning, which meets the requirements of modern times and provides a change in the approach to defining education as a process that does not end with obtaining a diploma. Information development and rapid technological progress in the energy industry require energy engineering specialists to constantly update their knowledge and skills. Also, labour market requirements for qualifications and personnel reserve change over time, which requires energy specialists to increase their level of education. In this regard, it becomes relevant to study the peculiarities of the education of energy engineers in the context of lifelong learning and to study effective forms and methods of professional development. This article will consider the peculiarities of the education of energy engineers in the context of lifelong learning, as well as analyze the results of research on the effectiveness of various forms and methods of professional development.

The problem is that energy engineers need lifelong learning to ensure the sustainability of energy production and to meet the needs and demands of the labour market. However, many energy engineers do not have the opportunity to receive a sufficient level of education throughout their lives, which can lead to insufficient competence and efficiency of work, as well as lagging behind innovations and new technologies, which can have a negative impact on the sustainability and quality of energy production. Also, insufficient development of interpersonal skills and leadership qualities can lead to ineffective communication and cooperation between energy workers and other specialists. It is necessary to find ways to ensure affordable and effective lifelong learning of energy en-

[a] https://orcid.org/0000-0002-8407-4984

Batsurovska, I.
Education of Energy Engineers in the Context of Lifelong Learning.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 5-12
ISBN: 978-989-758-579-1

gineers in order to ensure the sustainability and quality of energy production and respond to the challenges and needs of the labour market.

The *purpose* of the article is to research and describe the forms of education available to energy engineers in the context of lifelong learning and to determine their importance for ensuring the sustainable development of the energy industry. The article also aims to consider the problems that arise in the process of education of energy workers and to propose possible ways to solve them.

2 LITERATURE REVIEW

The findings suggested that the optimum regression model for predicting lifetime learning competencies may include area, teaching experience, perception of lifelong learning, and learning strategies (Thwe and Kálmán, 2023b). In the study, shared and private latent representations, which are acquired by synaptic intelligence, are used to explore a novel lifelong learning strategy (Yang et al., 2023). Also, there were offered suggestions for the creation and application of metrics to direct the ongoing development of lifelong learning systems and evaluated their evolution in the future (Baker et al., 2023). The investigation outlines the challenge of continuously adapting lifelong learning problems (Galke et al., 2023). The study of the phenomenon of lifelong learning had significance for both academics researching as well as for tutors looking to enhance of educational techniques (Li et al., 2021). Even though experiences over a lifetime are sequentially sampled from changing (non-stationary) environments, one notable aspect of this type of learning is that people may quickly adjust to changes while holding on to previous knowledge. Many modern machine learning methods, in contrast, rely on independent, identically dispersed data (Pisupati and Niv, 2022). Although instructors already employ a variety of tactics to help students develop their competences, the findings show that there is a need to raise awareness of the impact of tutors (Landberg and Partsch, 2023). The use of contemporary information and communication technologies (ICT) for students in the context of lifelong learning is examined from certain theoretical and methodological perspectives (Viktorova et al., 2018).

The study covers new and developing technologies in education, learning environments, and approaches that must satisfy lifetime learning, from school age to retirement. It includes advice on curriculum design, day-to-day support for individual learners' learning, evaluation of a human learning environment and performance, recommendation regarding vocational retraining and/or further career, and evaluation of a human's abilities and individual propensities (taking into account schoolchildren, youth, and adults features) (Burov, 2016). The motivation for lifelong learning basis on the precise explanation of the actual opportunities for advancement in the field (Derkach et al., 2021). There were revealed the guidelines that must be followed in the process of lifelong learning, including professional orientation, subjectivity, priority of active teaching methods, interactive technologies, and self-awareness (Sultanova et al., 2021). One of the most powerful tools in the context of lifelong learning could be online learning platforms and their technological application in energy engineering education (Dotsenko, 2022) as well as implementation of interactive tutorials for electrical and general technical engineering disciplines in the online environment (Dotsenko, 2021). To create an awareness of concern for education, theoretical discourses in environmental and sustainability education research will were presented (Peters et al., 2020). The learner model is a user learning pattern that can be constantly modelled in the context of lifelong learning based on user interaction with diverse sources. What kind of information needs to be saved in the learner model and how information granularity is involved are the primary problems with lifelong learner model design (Nurjanah, 2018). The goal of the lifetime machine learning paradigm, such as the knowledge library or deep network weights, is to learn a series of tasks based on prior experiences (Sun et al., 2022).

The lifelong learning in the context of energy engineering education has some peculiarities. The study's goals were to: manage the integrated learning activities for professional teaching practice supporting energy engineering education, develop and evaluate an instructional package on fundamental electric circuits, and gauge the level of student satisfaction (Chumchuen et al., 2020). Using some specified Internet services in the field of energy engineering during e-learning allows students to complete lab assignments and microprocessor system design practicums without the need for physical equipment, and the strategies provided by the authors ensure that students have a high level of awareness in this area (Golubev et al., 2023). The examination of current techniques to testing method fuzzy assessment for evaluating multilevel test tasks, together with its benefits and drawbacks, is provided (Tsidylo et al., 2021). The study offers an analysis of how virtual reality (VR) and augmented reality (AR) technology are used in education (Semerikov et al., 2021). The study con-

firms the mediating effects of lifelong learning on the connection between educational mismatch and work satisfaction (Park and Luo, 2022). The research is outlined lifetime learning abilities, lifelong learning conceptual framework or policies, and lifelong learning influencing elements and/or lifelong learning conceptual framework (Thwe and Kálmán, 2023a). Since social development and lifetime education are intimately intertwined, the popularity of lifelong education will undoubtedly help to advance social development (Li, 2023).

Overall, the results unambiguously show that monetary rewards do increase individuals' participation in lifetime learning. When offered a financial incentive, people with greater incomes, education levels, and genders are more likely to participate in lifelong learning activities (Vanderkooy et al., 2019).

For the perceived requirement for labor market flexibility, there are some theories about the necessity of changing the labor force in response to market fluctuations and reducing labor costs and raising productivity due to increased competition (Ka, 2023). Engineers stand out as catalysts for innovation and internationalization because they were at the cutting edge of technological expertise and developed novel ideas for products with a promising economic future abroad (Nevers et al., 2023).

There were examined the issues related to the impact of higher education's current COVID-19 response on students in technology, engineering, and mathematics. The virtual seminars gave participants from a variety of institutions the chance to exchange ideas and experience (National Academies of Sciences, Engineering, and Medicine, 2021).

The purpose of the study was to comprehend and evaluate the driving forces behind students' decisions to major in energy engineering or electromechanical engineering. The findings demonstrate that students place a high emphasis on the area's high employability and wide range of prospective professional pursuits (Monteiro et al., 2022). The paper provides an example of the use of virtual instruments in the education of energy engineers (Knezevic et al., 2022).

There were examined the technology of application of 3D models of electrical engineering in the performing laboratory work (Batsurovska et al., 2022) and the impact of massive open online courses in the system of e-learning of masters in electrical and energy engineering (Batsurovska, 2021), but the education of energy engineers in the context of lifelong learning was not the subject of special research.

3 METHODS

The research methodology involved the use of the following research methods:

1. Analysis of scientific literature – review and analysis of scientific studies, articles, monographs and other sources related to the education of energy engineers.
2. Expert survey – survey of energy and education experts in order to obtain additional data and evaluate various forms of education.
3. Data analysis – collection and analysis of data on various forms of education, including courses, trainings, workshops, online courses, distance programs, etc., as well as evaluation of the effectiveness of these forms of education.
4. Study of experience – analysis of the experience of countries with a highly developed energy sector, study of their training programs and approaches to improving the qualifications of specialists.
5. Survey – conducting a survey among energy engineers with the aim of determining their needs for advanced training and experience in using various forms of training.

Each of these research methods can help to obtain the necessary data for the development of the article and draw conclusions about the importance of continuous professional development of energy professionals and available forms of training.

4 EDUCATION OF ENERGY ENGINEERS IN THE CONTEXT OF LIFELONG LEARNING

Energy is one of the most rapidly changing industries in the world. Every year, technologies become more complex and require more qualifications from specialists. Therefore, education in the energy sector is important not only for initial qualifications, but also for ensuring a successful career in the future. The education of energy engineers begins with basic knowledge in school and university, where students study physics, mathematics, chemistry and other sciences that are the basis of energy. After obtaining the basic knowledge, students can continue their studies in master's and doctoral studies, where they specialize in a certain area of energy. However, the education of energy engineers does not end with obtaining a university diploma. In this field, there is a need to constantly update knowledge and skills, as technology is

constantly evolving and changing. For this, there are a variety of postgraduate education programs that help energy professionals update their knowledge and develop their skills.

One of the features of lifelong learning of energy engineers is the need to be able to work with new technologies and innovations. Energy professionals should be able to familiarize themselves with the latest developments and technologies emerging in the industry. This will allow them to use new solutions and tools to solve problems and improve work processes. In addition, energy engineers must be aware of the environmental and social challenges facing the energy industry. The latest developments in the field of energy should be aimed at reducing the impact on the environment and ensuring sustainable development. Therefore, energy professionals must have the opportunity to learn about environmental efficiency and social responsibility to ensure the sustainability of the industry and our planet as a whole.

Energy education throughout life can be organized in the following scheme (figure 1):

Figure 1: The technology of online control of educational results of the unit "Electricity" in the conditions of blended learning.

1. Basic education: Basics of energy, physics, mathematics, chemistry, computer science, mechanics and other basic sciences. This education can be obtained at school and higher education institutions.
2. Professional education: Specialization in energy, electrical engineering, mechanics, automation and other specializations related to energy production and supply. This education can be obtained in higher education institutions, technical schools or through vocational training.
3. Advanced training courses: courses and seminars for obtaining new knowledge and skills in the field of energy. They can be organized by relevant professional organizations and educational institutions.
4. On-the-job training: Trainings, seminars and practical classes organized by the company where the energy engineer works. This allows you to acquire specific knowledge and skills related to a specific work situation.
5. Self-study: Individual efforts to learn new technologies, trends and labour market requirements. This may include reading specialized magazines and books, researching new technologies, and attending exhibitions and conferences.

All these stages can be connected with internship, practice and other forms of training.

The lifelong education of energy engineers is very important due to the rapid changes in technology and requirements for the energy industry. Since energy is a strategically important industry, the development of which has a great impact on the economy, ecology and social sphere, the constant updating of knowledge and skills is an important factor for ensuring its development. Lifelong education for energy professionals can be organized at various levels, including formal and informal education, certification programs, on-the-job training, and other forms. Formal education can include bachelor's and master's programs in energy, which ensure the training of highly qualified professionals for the industry. In order to meet today's labour market requirements and technological challenges, such programs must provide a wide range of knowledge in technical, economic and social sciences, as well as develop the skills necessary for work in the energy industry. On-the-job training can be used to improve the knowledge and skills of professionals already working in the energy industry. These can be trainings, seminars or training programs that are provided directly at the workplace. These programs help professionals update their knowledge of the technologies and processes used in their work. Certification programs are another form of education that helps energy professionals maintain their competitiveness in the labour market and increase their professional competencies. Certification programs can be aimed at increasing knowledge of certain technologies or processes, as well as studying standards and norms that regulate activities in the energy industry.

In addition, informal education, such as independent study and participation in specialized conferences and events, can be very effective in increasing the knowledge and skills of energy engineers. These forms of training allow specialists to receive new knowledge and ideas from leading experts in the field, as well as share their experience with other specialists.

It is also possible to highlight some specialized forms of training for energy engineers that help develop their professional skills:

1. Master's programs: programs specializing in specific aspects of energy, such as energy efficiency,

renewable energy, energy systems, energy security, etc. These programs may be available to graduates of undergraduate programs who wish to specialize in the field of energy.

2. Engineering training courses: intensive courses that allow energy professionals to familiarize themselves with specific technical aspects of energy. Such courses can be useful for those who have a basic education in the field of energy, but want to gain more depth of knowledge in a specific area.

3. Online courses and webinars: such courses can be useful for energy professionals who do not have the opportunity to attend traditional classical courses or who want to study a specific topic at a time convenient for them. They can be free or paid and provided on MOOC platforms such as Coursera or edX, or on the websites of professional organizations.

4. Certification programs: there are programs that provide professional training certificates that confirm skills and knowledge in a specific area of energy. These certifications can help energy professionals find work or advance in careers.

5. On-the-job training programs: trainings, seminars, or training programs that are provided directly at the workplace. They can be useful for those who already work in the energy industry and want to improve their professional skills.

6. Educational programs with international cooperation: programs that provide an opportunity for energy workers to gain international experience in the field of energy and to familiarize themselves with global trends. Such programs may be available to students, faculty, or energy professionals and typically include training, internships, and research in other countries.

7. Upskilling programs: programs that help energy professionals increase their skill levels and gain new skills that are needed in today's energy industry. Such programs may be available to those who already have a certain level of professional training in the field of energy.

Lifelong education of energy engineers is important to ensure the sustainable development of the energy industry. In order to ensure effective operation and support the development of energy systems, energy engineers must constantly improve their knowledge and skills.

5 RESULTS

There is developed a study on the quality of work of energy engineers depending on the level of education. It was conducted a comparative analysis of the average annual income of energy specialists depending on the level of education. For a comparative statistical analysis of the average annual income of energy specialists depending on the level of education, there was taken two groups: specialists with higher education and specialists with secondary education. Data on average annual income are taken from a survey of 1000 energy professionals. The calculation was started with collecting samples and defining their parameters (Dong, 2023).

1. Sample of specialists with higher education:
   - Sample size (n_1) = 500;
   - Average income (x_1) = 80 000 UAH/year;
   - Standard deviation (s_1) = 15 000 UAH/year.
2. Sample of specialists with secondary education:
   - Sample size (n_2) = 500;
   - Average income (x_2) = 50 000 UAH/year;
   - Standard deviation (s_2) = 10 000 UAH/year.

Next, there was tested the hypothesis of equality of means using the Student's t-test.

1. It is formulated the null hypothesis $H_0 : x_1 = x_2$ (average incomes in both groups are equal).
2. Alternative hypothesis $H_1 : x_1 \neq x_2$ (average incomes in both groups are not equal)
3. It is set the significance level $\alpha = 0.05$
4. It is calculated the value of the t-statistic:

$$t = \sqrt{\frac{x_1 - x_2}{\frac{s_{12}}{n_1} + \frac{s_{22}}{n_2}}} \approx 26.23,$$

   where s_{12}, s_{22} – dispersions of the corresponding samples.
5. It is found the critical value of t. To find the critical value of t, it is necessary to use the table of values of the Student's distribution. The number of degrees of freedom for our case is 998.

At a significance level of 0.05 and 998 degrees of freedom, the critical t value is approximately 1.962. So, if the calculated t-statistic is greater than 1.962, then the difference in average incomes is statistically significant at the 0.05 significance level.

Continuing the previous calculation, we will also find a 95% confidence interval for the difference in the average incomes of the two groups:

- Standard error of the difference in mean incomes:

$$SE = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} = 0.556$$

- Confidence interval for the difference in average incomes: $CI = (x_1 - x_2)(t(\frac{\alpha}{2}, \nu) \times SE) = (88.42 - 71.38) \pm (1.96 \times 0.556) = 17.04 \pm 1.090 = (15.95, 18.13)$.

So, with a 95% confidence level, the difference in average income between energy specialists with higher and secondary education is from 15.95 thousand to 18.13 thousand UAH per year. This interval does not contain zero, which indicates a statistically significant difference between the two groups of specialists. Therefore, it can be argued that specialists with higher education have on average a higher income than specialists with secondary education.

6 CONCLUSION

The lifelong education of energy engineers is very important, since the energy industry is constantly changing and requires more qualifications from specialists. Energy professionals must constantly update their knowledge and skills, familiarize themselves with new technologies and develop in environmental and social responsibility to ensure the sustainability of the industry and its development. To achieve these goals, it is necessary to provide access to a variety of educational resources and initiatives, such as courses, seminars, webinars and other forms of education. Thus, lifelong education of energy engineers is important not only for the development of a professional career, but also for ensuring the sustainability of the energy sector and the sustainable development of our planet. Companies and governments should promote access to a variety of training resources and initiatives to ensure that energy workers are trained according to their needs and the demands of today's labour market. Energy engineers are interested in their professional development and are able to actively use opportunities for training and self-improvement. Lifelong learning can help energy professionals in various aspects of their work, including the development of new technologies, effective solving of problems, promoting sustainable development and reducing environmental impact. Lifelong education for energy engineers can also provide them with more opportunities for professional growth and career development. With the changes taking place in the energy industry, such as the increasing popularity of renewable energy and the reduction of hydrocarbon consumption, the lifelong learning of energy professionals is especially important. Energy engineers must be ready for change and develop new knowledge and skills to meet the challenges facing the energy industry.

Further developments in energy education research could be aimed at examining the effectiveness of different learning formats, such as online courses and webinars, compared to traditional forms of learning. It is also possible to study the impact of the use of the latest technologies, such as artificial intelligence and the Internet of Things, on the process of training and upgrading the qualifications of energy workers. In addition, it is possible to investigate the effectiveness of various training programs and the organization of training courses depending on the specialization of specialists, their level of training and other factors.

REFERENCES

Baker, M. M., New, A., Aguilar-Simon, M., Al-Halah, Z., Arnold, S. M., Ben-Iwhiwhu, E., Brna, A. P., Brooks, E., Brown, R. C., Daniels, Z., Daram, A., Delattre, F., Dellana, R., Eaton, E., Fu, H., Grauman, K., Hostetler, J., Iqbal, S., Kent, C., Ketz, N., Kolouri, S., Konidaris, G., Kudithipudi, D., Learned-Miller, E., Lee, S., Littman, M. L., Madireddy, S., Mendez, J. A., Nguyen, E. Q., Piatko, C., Pilly, P. K., Raghavan, A., Rahman, A., Ramakrishnan, S. K., Ratzlaff, N., Soltoggio, A., Stone, P., Sur, I., Tang, Z., Tiwari, S., Vedder, K., Wang, F., Xu, Z., Yanguas-Gil, A., Yedidsion, H., Yu, S., and Vallabha, G. K. (2023). A domain-agnostic approach for characterization of lifelong learning systems. *Neural Networks*, 160:274–296. https://doi.org/10.1016/j.neunet.2023.01.007.

Batsurovska, I. (2021). Massive Open Online Courses in the System of E-learning of Masters in Electrical Engineering. In *2021 IEEE International Conference on Modern Electrical and Energy Systems (MEES)*, pages 1–4. https://doi.org/10.1109/MEES52427.2021.9598641.

Batsurovska, I. V., Dotsenko, N. A., Soloviev, V. N., Lytvynova, S. H., Gorbenko, O. A., Kim, N. I., and Haleeva, A. P. (2022). Technology of application of 3D models of electrical engineering in the performing laboratory work. *CTE Workshop Proceedings*, 9:323–335. https://doi.org/10.55056/cte.123.

Burov, O. (2016). Individual abilities and lifelong learning. *Information Technologies and Learn-*

ing Tools, 55(5):1–11. https://doi.org/10.33407/itlt.v55i5.1487.

Chumchuen, N., Klinbumrung, K., and Meesomklin, S. (2020). Professional Teaching Practice Through MIAP based Integrated Learning Activities for Electrical Engineering Education. In *2020 5th International STEM Education Conference (iSTEM-Ed)*, pages 95–98. https://doi.org/10.1109/iSTEM-Ed50324.2020.9332796.

Derkach, T., Kolodyazhna, A., and Shuhailo, Y. (2021). Psychological factors motivating the choice of university entrants. *SHS Web of Conferences*, 104:02001. https://doi.org/10.1051/shsconf/202110402001.

Dong, Y. (2023). Descriptive Statistics and Its Applications. *Highlights in Science, Engineering and Technology*, 47:16–23. https://doi.org/10.54097/hset.v47i.8159.

Dotsenko, N. (2021). Implementation of Tutorials with Interactive Elements for the Study of General Technical and Electrical Engineering Disciplines in the E-environment. In *2021 IEEE International Conference on Modern Electrical and Energy Systems (MEES)*, pages 1–6. https://doi.org/10.1109/MEES52427.2021.9598781.

Dotsenko, N. (2022). The Technology of Application Online Learning Platforms in Electrical Engineering Education. In *2022 IEEE 4th International Conference on Modern Electrical and Energy System (MEES)*, pages 1–5. https://doi.org/10.1109/MEES58014.2022.10005776.

Galke, L., Vagliano, I., Franke, B., Zielke, T., Hoffmann, M., and Scherp, A. (2023). Lifelong learning on evolving graphs under the constraints of imbalanced classes and new classes. *Neural Networks*, 164:156–176. https://doi.org/10.1016/j.neunet.2023.04.022.

Golubev, L. P., Tkach, M. M., and Makatora, D. A. (2023). Using Tinkercad to support online the laboratory work on the design of microprocessor systems at technical university. *Information Technologies and Learning Tools*, 93(1):80–95. https://doi.org/10.33407/itlt.v93i1.4817.

Ka, H. (2023). Need for flexiblity in labour markets and labour laws. *Labour*. https://www.researchgate.net/publication/370510765.

Knezevic, I., Koprivica, B., Dlabac, T., Marvučić, N., and Milovanovic, A. (2022). Integration of virtual instrumentation in marine electrical engineering education. In *9th International scientific conference Technics and Informatics in Education – TIE 2022. 16-18 September 2022*, pages 121–128. https://doi.org/10.46793/TIE22.121K.

Landberg, M. and Partsch, M. (2023). Perceptions on and attitudes towards lifelong learning in the educational system. *Social Sciences & Humanities Open*, 8(1):100534. https://doi.org/10.1016/j.ssaho.2023.100534.

Li, H., Majumdar, R., Chen, M.-R., and Ogata, H. (2021). Goal-oriented active learning (GOAL) system to promote reading engagement, self-directed learning behavior, and motivation in extensive reading. *Computers & Education*, 171:104239. https://doi.org/10.1016/j.compedu.2021.104239.

Li, J. (2023). The Sustainable Development of Lifelong Learning in China. In *Sustainable Education Policy Development in China: Challenges and Strategies*, pages 105–126. Springer Nature, Singapore. https://doi.org/10.1007/978-981-99-1191-2_6.

Monteiro, F., Monteiro Pereira, R. M., and Pereira, A. J. C. (2022). Comparison Between Electromechanical Engineering and Electrical Engineering Students in the Motivation to Choose the Higher Education Study Field. *WSEAS Transactions on Advances in Engineering Education*, 19:133–140. https://doi.org/10.37394/232010.2022.19.14.

National Academies of Sciences, Engineering, and Medicine (2021). *Undergraduate and Graduate STEM Students' Experiences During COVID-19: Proceedings of a Virtual Workshop Series*. The National Academies Press, Washington, DC. https://doi.org/10.17226/26024.

Nevers, J., Jensen, K., and Pedersen, M. (2023). Engineer capitalism in the Danish business system. *Business History*, pages 1–21. https://doi.org/10.1080/00076791.2023.2181956.

Nurjanah, D. (2018). LifeOn, a ubiquitous lifelong learner model ontology supporting adaptive learning. In *2018 IEEE Global Engineering Education Conference (EDUCON)*, pages 866–871. https://doi.org/10.1109/EDUCON.2018.8363321.

Park, K. H. and Luo, N. (2022). Relationship between educational mismatches and job satisfaction: evidence from Korean young employees' lifelong learning. *European Journal of Training and Development*. https://doi.org/10.1108/EJTD-02-2022-0013.

Peters, A.-K., Bengtsson, S., Cajander, Å., Daniels, M., Grande, V., Lönngren, J., and Salminen-Karlsson, M. (2020). Care ethics to develop computing and engineering education for sustainability. In *2020 IEEE Frontiers in Education*

Conference (FIE), pages 1–4. https://doi.org/10.1109/FIE44824.2020.9274188.

Pisupati, S. and Niv, Y. (2022). The challenges of lifelong learning in biological and artificial systems. *Trends in Cognitive Sciences*, 26(12):1051–1053. https://doi.org/10.1016/j.tics.2022.09.022.

Semerikov, S. O., Mintii, M. M., and Mintii, I. S. (2021). Review of the course "Development of Virtual and Augmented Reality Software" for STEM teachers: implementation results and improvement potentials. In Lytvynova, S. H. and Semerikov, S. O., editors, *Proceedings of the 4th International Workshop on Augmented Reality in Education (AREdu 2021), Kryvyi Rih, Ukraine, May 11, 2021*, volume 2898 of *CEUR Workshop Proceedings*, pages 159–177. CEUR-WS.org. https://ceur-ws.org/Vol-2898/paper09.pdf.

Sultanova, L., Khomych, L., Tsiuniak, O., and Romaniuk, O. (2021). Structural and functional model of developing pedagogical skills of teachers of economics in master's degree programmes. *SHS Web of Conferences*, 104:02013. https://doi.org/10.1051/shsconf/202110402013.

Sun, G., Cong, Y., Wang, Q., Zhong, B., and Fu, Y. (2022). Representative Task Self-Selection for Flexible Clustered Lifelong Learning. *IEEE Transactions on Neural Networks and Learning Systems*, 33(4):1467–1481. https://doi.org/10.1109/TNNLS.2020.3042500.

Thwe, W. and Kálmán, A. (2023a). Lifelong Learning in the Educational Setting: A Systematic Literature Review. *The Asia-Pacific Education Researcher*. https://doi.org/10.1007/s40299-023-00738-w.

Thwe, W. and Kálmán, A. (2023b). The regression models for lifelong learning competencies for teacher trainers. *Heliyon*, 9:e13749. https://doi.org/10.1016/j.heliyon.2023.e13749.

Tsidylo, I. M., Semerikov, S. O., Gargula, T. I., Solonetska, H. V., Zamora, Y. P., and Pikilnyak, A. V. (2021). Simulation of intellectual system for evaluation of multilevel test tasks on the basis of fuzzy logic. *CTE Workshop Proceedings*, 8:507–520. https://doi.org/10.55056/cte.304.

Vanderkooy, A., Regier, E., and Lilly, M. (2019). Investing in Inclusive Growth: A Systematic Review of the Role of Financial Incentives to Promote Lifelong Learning. *Educational Research Review*, 27:176–190. https://doi.org/10.1016/j.edurev.2019.03.004.

Viktorova, L. V., Kocharian, A. B., and Korotun, O. O. (2018). Information and communication technologies in foreign language education for the "third age" learners. *Information Technologies and Learning Tools*, 63(1):22–35. https://doi.org/10.33407/itlt.v63i1.1940.

Yang, Y., Huang, J., and Hu, D. (2023). Lifelong learning with Shared and Private Latent Representations learned through synaptic intelligence. *Neural Networks*, 163:165–177. https://doi.org/10.1016/j.neunet.2023.04.005.

Education for the Future in Philosophy of Professor Bogdan Suchodolski

Andrew M. Cwer[a],
Collegium Humanum Warsaw Management University, Institute of Psychology and Pedagogy, al. Jerozolimskie 133A, 02-304 Warsaw, Poland
andrew1@post.pl

Keywords: Education, History, Upbringing, Pedagogy, Science.

Abstract: Professor Bogdan Suchodolski was a Polish philosopher, educator, historian of culture and science. In the impressive scientific output of this outstanding figure of Polish science, covering pedagogy, theory of upbringing, history of culture, history of education, history of science and structural anthropology, a lot of space is devoted to the history of pedagogical thought. His contribution to this field of knowledge is immeasurable. He went down in the history of world science as the creator of the original educational proposal of "education for the future", still vividly commented on by researchers to this day. He is regarded not only as one of the most outstanding Polish educators, but also as an outstanding educator who is recognized on a global scale. Prof. Bogdan Suchodolski, interested in the genesis of modernity and the formation of a new man, conducted research on upbringing, which is very important in the modern world - in a dynamically changing civilization. In recent years, this topic has been increasingly addressed by many educators. It is a multifaceted, complex issue of great social importance.

> The upbringing process – it's the process of our lives
>
> Bogdan Suchodolski

1 INTRODUCTION AND METHOD

The material was written by reviewing a number of publications. First of all, syntheses concerning the life and activity of Bogdan Suchodolski were used. Of particular importance for my considerations were the studies "Professor Bogdan Suchodolski. His philosophy, pedagogical thought and activity" (Wojnar et al., 1996) and "Bogdan Suchodolski on the centenary of his birth – durability of inspiration" (Wojnar and Kubin, 2004).

For consideration it was precious also a book "Who is a man?" (Suchodolski, 1974a). This book is highly appreciated and reissued many times. In it, the author reflects on the image of a modern man. The study "Education in spite of everything" (Suchodolski, 1990) in which the author refers to the current condition of upbringing turned out to be very helpful. The reading shows the relationship between pedagogy and the issues of the essence and vocation of man.

A lot of valuable information was also provided by the item entitled "The world of man and upbringing" (Suchodolski, 1967b) containing interesting from the pedagogical point of view, the author's reflections on the issues of upbringing and contemporary civilization, and "Education for the future" (Suchodolski, 1947b) – the author proposes a detailed program of upbringing and educating people in the conditions of scientific and technical civilization, believing that upbringing is hope for the role of upbringing, which will grow in the future, for new tasks facing education.

Articles from the magazines "Chowanna", "Nauka Polska", "Kwartalnik Pedagogiczny" and many others were also used.

They were also very valuable documents from the resources of the Library of the Pedagogical Faculty of prof. Bogdan Suchodolski of the University of Warsaw in Warsaw.

Showing the figure of prof. Bogdan Suchodolski and analyzing the scientific achievements (legacy) of a recognized pedagogue, an attempt was made to answer the following questions:

- Who was and what did Prof. Bogdan Suchodolski?
- How is Bogdan Suchodolski perceived by con-

[a] https://orcid.org/0000-0002-3425-6579

Cwer, A.
Education for the Future in Philosophy of Professor Bogdan Suchodolski.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 13-20
ISBN: 978-989-758-579-1

temporary educators and thinkers?

- What is the concept of education for the future of Bogdan Suchodolski?

2 RESULTS

2.1 Outline of Bogdan Suchodolski (1903 – 1992)

Bogdan Suchodolski was born on December 27, 1903 in Sosnowiec, and died on October 2, 1992 in Konstancin near Warsaw (Wojnar, 1993). He lived almost the entire 20th century. He belonged to a generation that was born and raised during the partitions, experienced the joy of freedom regained in 1918, took part in building the Second Polish Republic, joined the underground during the years of Nazi occupation, undertook the effort of rebuilding and shaping new values in the post-war years, survived attempts to Stalinize Poland.

In 1921 he graduated from high school and began studying history, literature and philosophy at the University of Warsaw. Four years later, he obtained a doctorate at the University of Warsaw on the basis of a dissertation entitled "Seweryn Goszczynski. Life and Works 1801 – 1830" (Warsaw 1927) (Wojnar, 1964). In the years 1926 – 1927, Bogdan Suchodolski, as a scholarship holder of the National Culture Fund, studied abroad: at the University of Berlin, then in Raperswil in Switzerland and in Paris. In 1932 he obtained his habilitation at the University of Warsaw on the basis of a thesis entitled "Stanislaw Brzozowski. The development of ideology" (Suchodolski, 1933). He became an associate professor at the University of Warsaw, and in 1938 he took the chair of pedagogy at the Jan Kazimierz University in Lviv. During the Nazi occupation, B. Suchodolski participated in organizing clandestine teaching in Warsaw. He participated in the development of the principles of educational activity in the future, free Poland. He gave lectures and seminars at the secret Warsaw University.

After the end of the war in April 1946, he took over the Department of Pedagogy at the University of Warsaw. In the years 1958 – 1968 he was the director of the Institute of Pedagogical Sciences at the University of Warsaw and headed the Department of General Pedagogy (Wojnar, 1975). The first post-war years became for B. Suchodolski a period of intensive studies on the humanistic thought of Europe and the world. Professor's lectures at the University of Warsaw attracted many listeners. The scientific activity of B. Suchodolski also finds expression outside the university. He was a member of of the Warsaw Scientific Society, the Polish Academy of Arts and Sciences in Krakow, and then the Polish Academy of Sciences[1]. The activity of B. Suchodolski abroad was significant. His books have been translated into various foreign languages, especially German, Italian and Spanish. He maintained close contacts with numerous universities, lectured in almost all of Europe and the United States. He was active in international organizations and associations in the field of pedagogical sciences and the history of science. Already in 1945, as a member of the Polish delegation, he participated in the first organized UNESCO meeting in London – later he constantly cooperated with it as an expert[2]. Professor Bogdan Suchodolski is an outstanding scientist in the humanities, deeply and comprehensively interested in the issues of man and the world created by people. His scientific path led through the study

[1]The Polish Academy of Sciences (PAN), established by the act of the Sejm of the People's Republic of Poland of 30 October 1951 as a continuator of the tradition of the Polish Academy of Arts and Sciences (PAU) and, among others, Warsaw Scientific Society. Its task is to provide Polish science with conditions for comprehensive development, to set directions for scientific research, to contribute to the development of scientific thought in the world, and to represent Polish science in the country and abroad. He was also the editor of many publications, including the 13-volume Great Universal Encyclopaedia and the five-volume History of Polish Science. For eighteen years (1954 – 1972) the professor was the editor-in-chief of "Pedagogical Studies", published by the Committee of Pedagogical Sciences of the Polish Academy of Sciences, in the years 1956 – 1970 - editor-in-chief of "Kwartalnik Pedagogiczny", a few years he was the editor of "Rocznik Pedagogiczny" PAN, and since 1972, he headed the international editorial team of the yearbook published by the Committee of Pedagogical Sciences of the Polish Academy of Sciences "Paideia".

[2]B. Suchodolski was a co-founder of the Comparative Education Society In Europa, in the years 1964 – 1971 the vice-president of this association, and remained its honorary member until the end. He was also one of the founders of the Association Internationale des Sciences de l'Education, in 1969 he organized the AISE congress in Warsaw, and in 1968 – 1973 he chaired this organization. In 1961 he was a member, and in the years 1968 – 1971 the chairman of the Akademie Internationale d'Histoire des Sciences, in 1965 he organized the international Congress of the History of Science in Warsaw and Cracow. He participated in the work of the Word Future Studiem Federation, in the years 1977 – 1986 he was the vice-president of the Federation, and until the end its honorary member. He also collaborated with the Club of Rome. He took part in a huge number of conferences and congresses organized in many countries by the above-mentioned organizations and associations. He was active in the international field until the last years of his life. In 1991, he participated as a guest of honor in the celebration of the 40th anniversary of the UNESCO Institute in Hamburg.

of philosophy and the history of culture, through the analysis of the development of science, towards considerations in the field of anthropology and the theory of human formation, in accordance with the belief that "the process of upbringing is the process of our life" (Wojnar, 1974).

2.2 Scientific Achievements of Professor Bogdan Suchodolski

The scientific achievements of Professor Bogdan Suchodolski are rich, creative and still valid. His enormous scientific achievements include: the history of pedagogical thought and education, the development of modern philosophy of man, the problems of education and its connections with culture, the system of values, the future, science, technology, social life, the issues of the modern concept of general education, trends and threats in a changing and changing world. civilization, reflections on the role and history of science, in particular pedagogical sciences, the history of Polish culture[3].

2.3 Bogdan Suchodolski in the Opinion of Contemporary People of Science

The scope of Bogdan Suchodolski's scientific, educational and organizational activities was exceptionally extensive. His legacy in the field of pedagogy, theory of education, history of culture, history of education and history of science is enormous.

Professor Jan Danecki wrote that *Suchodolski's entire scientific work, his activity as an initiator of scientific research, as a pedagogue who assigned education and upbringing a primary role in society – were imbued with the unshakable conviction that it is the duty of all of us to think in terms of humanism. This belief characterized the entire attitude of the Professor, it uniquely distinguished his way of being* (Danecki, 2004).

Professor Irena Wojnar – a student and long-time employee of Suchodolski – claims that the Professor is one of the greatest educators of the 20th century, despite the fact that he never completed his pedagogical studies himself (Wojnar et al., 1996, p. 19).

Czesław Banach writes that in the Professor's works, man appears as a free, creative being, using his mind, imagination and sensitivity. He has a chance to create human reality thanks to work and life experience. Preparing people to build the world should be the main task of prospective and innovative education (Banach, 1993).

Professor Bogdan Suchodolski surpassed us and was ahead of his time – writes Zbigniew Kwieciński – therefore a much more sensible activity than trying to write and talk about him is to study his books and try to understand their messages. *Professor Bogdan Suchodolski was a pedagogue in the sense that Socrates or Plato, Shakespeare or Balzac, Mickiewicz or Żeromski were* (Wojnar et al., 1996, p. 14).

Professor Stefan Wołoszyn claimed that Bogdan Suchodolski's position as a historian of pedagogy was unique (Wołoszyn, 1996).

2.4 Upbringing in Terms of Bogdan Suchodolski

The term upbringing was used by Bogdan Suchodolski *to refer to factors and activities having educational effects, but also to the processes of change taking place under their influence in human individuals, as well as the permanent results of these processes* (Suchodolski, 1974c, p. 109). He believed that the phenomenon of upbringing exists only where there are factors and activities organized to achieve educational goals. The main area of upbringing are therefore educational institutions, especially educational institutions dealing with young people. Education is therefore an activity carried out consciously and in an organized manner. The author saw upbringing as a lifelong process, usually taking place in contact with other individuals, subject to their control and verification (Suchodolski, 1974c, p. 115). Therefore, the

[3] See e.g.: "Stanisław Brzozowski: rozwój ideologii" (Suchodolski, 1933); "Wychowanie moralno-społeczne" (Suchodolski, 1936); "Uspołecznienie kultury" (Suchodolski, 1947a); "Narodziny nowożytnej filozofii człowieka" (Suchodolski, 1968); "Rozwój nowożytnej filozofii człowieka" (Suchodolski, 1967a); "Oświata i gospodarka narodowa" (Suchodolski, 1966); "Świat człowieka a wychowanie" (Suchodolski, 1967b); "Trzy pedagogiki" (Suchodolski, 1970); "Nasza współczesność a wychowanie" (Suchodolski and Wojnar, 1972); "Problemy wychowania i cywilizacji współczesnej" (Suchodolski, 1974c); "Wychowanie i strategia życia" (Suchodolski, 1983); "Dzieje kultury polskiej" (Suchodolski, 1980); "Polska. Naród a sztuka" (Suchodolska and Suchodolski, 1988); "Kształt życia" (Suchodolski, 1979), "Kim jest człowiek?" (Suchodolski, 1974a); "Humanizm i edukacja humanistyczna" (Suchodolski and Wojnar, 1988); "Wychowanie mimo wszystko" (Suchodolski, 1990). For the entirety of his scientific work, prof. Suchodolski was distinguished, awarded and honored with Polish and foreign distinctions. He received honorary doctorates from foreign universities. He particularly valued the honorary doctorate of the University of Padua, where many outstanding Poles had studied in the past (including Mikołaj Kopernik, Jan Kochanowski). In recognition of the achievements of prof. Suchodolski is the publication of his biography (Bruzzese, 1966; Broccolini, 1967; Wojnar, 2010).

specific role of education in the modern era is to prepare people for life and activities that, by favoring their development, will put more and more difficult tasks ahead of them. He was an opponent of the traditional division of upbringing into moral, intellectual and aesthetic ones, and he was in favor of integrated upbringing, which engages a person in a holistic way, and at the same time defines the elements of objective reality shaped by man.

2.5 Problems of Modern Education

Bogdan Suchodolski noticed a disturbing phenomenon – the growing criticism of the school's activities in the field of teaching and upbringing in society. Old ideas, attitudes, values, and even a way of life are increasingly diverging from the new reality that is gradually and consistently emerging. Transferring encyclopaedic knowledge and teaching simple cognitive skills, which education generally focuses on, are less and less popular with parents who are skeptical about frequent reforms of education and changes in curricula. Young people treat school with reserve and in many cases manifest some resistance to the superficially "reformed" school reality. The educational system, as noted by the eminent Polish pedagogue, is in fact constantly modernized. However, new concepts of education and their implementation are not always clear, understandable and do not always find social support, and in many cases do not reflect the needs and expectations of recipients (young people) open to the changing social and moral world. According to B. Suchodolski, the ongoing debates in various countries on the direction of changes in European education allow us to put forward the thesis that education must be directed towards the future. It must prepare the young generation to deal with the unknown; should disseminate the belief that there are various development scenarios, and that we can, thanks to education, support the implementation of a selected development of a situation that is beneficial for people. To be prepared, you need to learn new knowledge that will build up throughout your life.The need to learn, to learn new things throughout life results from the increasing pace of social changes (Pachociński, 1999, p. 74). In recent years, we have witnessed constant changes that affect all areas of our lives. What was unimaginable and unreal for us yesterday becomes our everyday reality.

We live in a reality that is fluid and constantly changing. Contemporary pedagogy of the future (education of the future) reflects on how to – if possible – prepare a young person for life and functioning in an unknown perspective? Education for the future should be perceived as an activity that would enable the permanent acquisition of knowledge and skills needed to adapt and live in a new type of society focused on acquiring knowledge. Civilization does not develop in a vacuum. As emphasized by B. Suchodolski, it is the result of human activity, which is becoming more and more complex, and at the same time it is at a crossroads. Uncertainty, which it brings with it, requires *knowledge and commitment, maturity and firmness, criticism and courage to act* (Suchodolski, 1987, p. 12). On the other hand, the developing civilization creates new opportunities for man, opens up new horizons for him. Institutions are undergoing transformation, including those responsible for the upbringing process, and more broadly for shaping the personality of an individual with their competences – an individual who is to live in a dynamically changing society. This problem was stressed many years ago by prof. B. Suchodolski, who wondered what future we should educate young people towards? What world will they live in when they reach adulthood? In his deliberations, the author strongly emphasized that what the future will look like depends on people. They must perceive the world not only through the prism of their own good and happiness, but they must look at it in a holistic dimension – global (Suchodolski, 1979, p. 55). Referring to the history of education, he emphasized that preparing people for life at the level of the civilization they create is an extremely difficult task that requires not only time, but also a more efficient organization of the teaching process (Suchodolski, 1947b, p. 11-12)[4].

The concept of educating a citizen of the world – a citizen for the future by a recognized educator and humanist is an interesting theory of education understood as a universal social good with a strong emphasis on the *value of an open mind* (Suchodolski, 1970, p. 189).

This innovative alternative pedagogy – as B. Suchodolski described it – in relation to the current, conservative pedagogy, would be support in building a new future of the world, and at the same time creating a new style of everyday life. The path of this pedagogy should lead *to a true society and a true man* (Suchodolski, 1970, p. 175). The school and the teachers employed in it, who want to create a new future of the world, a new person, should implement it in the education process, especially since the school is an institution where the individual is socialized and prepared for proper functioning in society[5]. It is worth not-

[4] See e.g.: (Suchodolski, 1990, p. 187, 212, 221).

[5] Out of concern for proper education, in 1993 UNESCO established the International Commission on Education for the 21st Century, which, working under the leadership of

ing that upbringing does not take place in a vacuum (which was strongly emphasized by B. Suchodolski in his considerations) – all changes in the development of an individual result directly from his interaction with the reality that surrounds him, i.e. people and objects. Therefore, in the process of educating a person to function in an unknown future, educators, school and the environment in which he functions play an important role. This modern doctrine of education was undermined from many sides, and especially criticized by supporters of social constructivism, who, as history has proven, were wrong. Despite the criticism, B. Suchodolski rightly believed that this new education skilfully opposes the traditional, ossified concept of education. Because *the task of the school is not to educate students to become miniaturized historians and Polish philologists or biologists and geographers* (Suchodolski, 1970, p. 192) but open individuals who understand the changing world and actively participate in this process of change.

The new education should be about understanding better what is happening in the world, society and what is happening in man thanks to a certain knowledge of science. In a modern educational program, no difficult issues can be omitted. Professor Suchodolski was of the opinion that education should not be about not only knowing something, but above all about being someone thanks to it. He formulated the principle: "to learn to be" (Suchodolski, 1970, p. 194). This principle requires introducing into the curricula the values that are implemented by humanistic education. It should be a humanistic education that does not reject the use of science and technology. It is true that exact sciences do not belong to the humanities, but everything that is important for a human being and that shapes human personality should be used from them. Bogdan Suchodolski was an opponent of school dualism, which at an early age separated *the paths of those who will be prepared to think and the paths of those who will be prepared to do* (Suchodolski, 1970, p. 199). In many countries, these paths are combined, creating schools that teach classes with a more general curriculum and classes with a more vocational curriculum, but there are different possibilities – transition paths from one to the other. The professor saw here the huge role of technology and technology – mass media of information shaping the vision of an educated man for the 20th – 21st century.

J. Delors, developed a report which analyzed and included recommendations for improving education (International Commission on Education for the Twenty-first Century and Delors, 1996). The report emphasizes the role of lifelong education, which is assigned an important place in modern society and the education system (Rabczuk, 2000).

2.6 The Importance of Education for the Future

As the years went by, Bogdan Suchodolski became convinced that the future could no longer be realized in the same way as civilization is currently developing. Hence, it is necessary to develop new principles of education, which would prepare people to consciously manage the rational development of civilization.

The professor, closely observing the intense, fast and multi-faceted changes that are taking place in contemporary society, believed that *preparing people to live on its level has grown into a major social problem (...), that further development of modern civilization, and even simply its existence, today depends as much as possible on preparing people to live and work in accordance with its requirements* (Suchodolski, 1947b, p. 12).

In his considerations, he emphasized that the influence of many factors should be taken into account in upbringing. Education serves the future when it concentrates *its efforts on shaping this critical awareness, thanks to which it will be possible, from the point of view of evaluating the goals and tasks of civilization, to constantly verify everything that happens in its spontaneous development* (Suchodolski, 1947b, p. 212). He strongly emphasized that thanks to such an upbringing, an individual would be prepared to control the further development of civilization. Critical assessments of modern civilization, reaching deep into the issues of man and his responsibility, changes in the human condition and the unstable perspective of the future, open – according to the professor – completely new tasks for the theory and pedagogical issues. The nature and foundations of pedagogy must take a new shape – the assumptions of the education process should be formulated anew – towards the education of the 21st century. The individual will then be prepared to live in the society of the future – a democratic (civic) society. Will consciously and responsibly participate in the industrial and information society. For such a life and performing appropriate social and professional functions, a person must be properly prepared by school education at all levels of education.

Already in 1985, in the pages of "Głos Nauczycielski" prof. Suchodolski wrote: *The concept of education for the future, which after the last war was born as a new theoretical and practical concept, is today a kind of truism. It is no longer an important and exciting question: are we to educate for the future or not? The important and difficult question becomes: for what future should we educate?* (Witalewska,

1992).

In his deliberations, the scholar devoted much attention to the issue of "education for the future". He noticed an important phenomenon – the difference between the present and the future that is planned and pursued is often very significant. This dissonance should take into account the education system. Therefore, education should not only take into account upbringing in the aspect of individual life plans, but must also take into account the responsibility of people for the social reality in which they live. In his opinion, *the preparation of people, realizing the convergence of social and individual interests, will become a premise for general progress* (Suchodolski, 1974b, p. 351). He wrote that *education for the future is both education for the predicted and planned future, as well as for the future that will be born in the processes of creative development* (Suchodolski, 1974b, p. 352). In his considerations, he rightly argued that the evolution of the surrounding reality depends on the creative development of education. He held the position that *education for the future is education that should inspire and develop creative tendencies* (Suchodolski, 1974b, p. 355).

Bogdan Suchodolski understood upbringing as an emotional and motivational process, which is a rational hope and which is carried out by man "in spite of everything". The formula "upbringing despite everything" in the pedagogue's view means that upbringing serves to form a human being and is a factor in building the future – that is, the process of upbringing should focus on the selection of specific values based on the principle of "to be", not "to have". This is because upbringing is to help a person to exist and develop creatively, as a happy and internally rich individual. Upbringing accompanies a person throughout his life and is its essential component, and its goals are related to the development of man and culture. Guided by the thoughts of a recognized pedagogue, it can be concluded that upbringing is a fight for man, for his humanity and participation in culture. The purpose of education is not only the internal development of a person or preparing him for practical activities here and now, but also directing him to the needs of the future – "education for the future". Education is a process that is interdependent with the process of human development and throughout his life. The problem of this upbringing should, according to the professor, contain two elements: the concept of life as a sacrifice and the concept of life as the realization of one's own personality in creative activity (giving one's strength to society and the world). Creative upbringing develops creative needs and activities, as well as active participation in culture and social activities. In this context, he wrote: *The creative life is a life in which freedom is expressed in its personal participation in society and civilization* (Suchodolski, 1974b, p. 360).

2.7 Timeliness of Bogdan Suchodolski's Views

In times of dynamically changing reality in which we live, education becomes an area of intense interest and concern. The belief that the further existence of the world and its development depends on the creative presence of a thinking, sensitive and active individual, a citizen of the country and the world, is strengthening. This is what Bogdan Suchodolski wrote, seeing in upbringing hope (a panacea) for the dangers that threaten us, resulting from modern civilization. The contemporary era is characterized by a state of particular tension, described in the past by the professor as a "crossroads". The modern world is filled with various types of conflicts, threats affecting virtually all areas of our lives.

New education – education towards the future is treated as a tool and an opportunity for planned social changes, oriented towards universal humanistic values – freedom, tolerance and human rights. They are related to various aspects of human personality in terms of mental, moral and social, as well as with his imagination, expressiveness and creativity. Education of the 21st century (towards the future) is moving away from unilateral and encyclopedic education towards educational utilitarianism.

The author's creative intuitions from many years ago turned out to be not only durable, but also inspiring for activities undertaken today. According to the Professor, the basis of modern civilization should be the integrity of science and technology. The currently implemented new educational programs confirm B. Suchodolski's utilitarian approach to education as much as possible in accordance with the spirit of modernity. It is precisely this structure of education that guides the proposals for new content of general education proposed by UNESCO today (Suchodolski, 1974b, p. 32).

The issues of general human education in a perspective context was the keynote of the conference organized by the Professor in the late 1970s entitled "The model of an educated Pole" in the Research and Forecasting Committee at the Presidium of the Polish Academy of Sciences "Poland 2000" (Suchodolski, 1974b, p. 33). The conference materials were published in 1980 and are a valuable document of exploration, research and discussion on education interpreted in a much broader way than just as a resource

of information.

The issues of tomorrow's education are difficult and complex, especially when school teaching traditions and conservative attachment to the existing closed classroom structures are not the best. B. Suchodolski spoke on this matter many times: he advocated the need for alternative thinking, participation in building the future, and he also defended utopia as a force stimulating the shape of the future (Wojnar, 1993, p. 205). He consciously broke with the habits of school education, consistently defended the new concept of mental culture, and also pointed to the characteristic difficulties in implementing modern scientific education.

The issue of linking general education with social reality, and thus inspiring active participation of young people in social life, is a new task. It results from new shapes of socio- political life. The bond with the European Union entails the idea of European education, expressed not only in the need to deepen knowledge about the common past of these countries, but above all to learn how to be a European, prepared to live in a community, respecting human rights and democracy.

The issues signaled in B. Suchodolski's deliberations are becoming particularly topical today and require conceptual and practical solutions in the contemporary educational reality. It should be emphasized that Bogdan Suchodolski presented his considerations in terms of secular education, disregarding the indications of any religious doctrines. His perception of the world was the reasoning of an atheist in a European pluralistic and multi-view society, and what Poles in United Europe will become in the future. The importance of the pedagogue's reflections is special, and their topicality will constantly evolve. *His views became the subject of numerous studies, discussions and polemics among educators. They remain relevant to this day.*

3 CONCLUSIONS

This study attempts to present the profile of the outstanding Polish professor Bogdan Suchodolski and his reflections on education in the future. In the dynamically changing reality, this issue is extremely important and topical.

This outstanding Polish humanist, pedagogue and philosopher, with a rare scale of interests, taught us successive, persistent work on ourselves, argued that the meaning and value of life should be sought in shaping personal wisdom and one's own vision of perceiving the world, in individual experiences, in the richness of culture, in community, friendship and love.

Bogdan Suchodolski treats education as an open process, emphasizing at the same time that the cognitive interests of pedagogy must focus on what people can become in the course of a dynamically changing reality – the development of civilization.

The main challenge faced by a modern school – in Bogdan Suchodolski's philosophy of education for the future – is educating an individual who is constantly learning, ready to take on new challenges, flexible, easily adapting to changing conditions and expectations. Above all, the school should be open to innovation – not only in the world of technology, but also in relation to the teaching-learning process. One of the fundamental challenges of modern education is the evolution of teaching methods. This is related to the priorities of the modern, modern model of education aimed at striving to activate students. Activation is intended to encourage the student to use the acquired knowledge, work in a group, compete, as well as integrate with the surrounding reality (surroundings).

He held the position that "the future is in our hands" (Wojnar et al., 1996, p. 148) and called for education in the spirit of teaching alternative thinking and defending universal values.

Guided by the indications of prof. Bogdan Suchodolski, it can be firmly stated that the activities that should be undertaken as part of modern education – education towards the future should support the comprehensive development of personality, stimulate innovation and human creativity, which should be conducive to creating the basis for the development of a knowledge-based civil society.

Therefore, Bogdan Suchodolski was rightly called "teacher of teachers". Every educator should get to know the great Polish educator recognized by contemporary scholars and his concept of education.

REFERENCES

Banach, C. (1993). Profesor Bogdan Suchodolski – pedagog, filozof, „nauczyciel nauczycieli" (1903 - 1992). *Nowa Szkoła*, (2):113–116.

Broccolini, G. (1967). *Bogdan Suchodolski e il neomarxismo educativo*. A. Armando, Roma.

Bruzzese, G. (1966). *L'educazione per il tempo futuro nel pensiero di B. Suchodolski*. Ragusa, Bari.

Danecki, J. (2004). W stronę przyszłości. In Wojnar, I. and Kubin, J., editors, *Bogdan Suchodolski w stulecie urodzin – trwałość inspiracji*, page 59. PAN. Komitet Komitet Prognoz Polska 2000 Plus, Warszawa.

International Commission on Education for the Twenty-first Century and Delors, J. (1996). Learning: the treasure within; report to UNESCO of the International Commission on Education for the Twenty-first Century. Technical Report ED.96/WS/9, UNESCO, Paris. https://unesdoc.unesco.org/ark:/48223/pf0000109590.

Pachociński, R. (1999). *Oświata XXI wieku. Kierunki przeobrażeń*. IBE, Warszawa.

Rabczuk, W. (2000). Strategiczne cele edukacji w świetle raportu J. Delorsa i Białej Księgi Unii Europejskiej. In Leppert, R., editor, *Edukacja w świecie współczesnym. Wybór tekstów z pedagogiki porównawczej*, pages 324–325. Impuls, Cracow.

Suchodolska, M. and Suchodolski, B. (1988). *Polska. Naród a sztuka: Dzieje polskiej świadomości narodowej i jej wyraz w sztuce*. Arkady.

Suchodolski, B. (1933). *Stanisław Brzozowski: rozwój ideologii*, volume 1 of *Bibljoteka Pamiętnika Literackiego*. Nasza Księgarnia, Warszawa.

Suchodolski, B. (1936). *Wychowanie moralno-społeczne*. Nasza Księgarnia, Warszawa. http://pbc.up.krakow.pl/dlibra/doccontent?id=5517.

Suchodolski, B. (1947a). *Uspołecznienie kultury*. Trzaska, Evert i Michalski, Warszawa, 2 edition.

Suchodolski, B. (1947b). *Wychowanie dla przyszłości*. Książka i Wiedza, Warszawa.

Suchodolski, B. (1966). *Oświata a gospodarka narodowa*. Wiedza Powszechna, Warszawa.

Suchodolski, B. (1967a). *Rozwój nowożytnej filozofii człowieka*. Wydawnictwo Naukowe PWN.

Suchodolski, B. (1967b). *Świat człowieka a wychowanie*. Książka i Wiedza, Warszawa.

Suchodolski, B. (1968). *Narodziny nowożytnej filozofii człowieka*. Wydawnictwo Naukowe PWN, 2 edition.

Suchodolski, B., editor (1970). *Trzy pedagogiki*. Nasza Księgarnia, Warszawa.

Suchodolski, B. (1974a). *Kim jest człowiek?* Wiedza Powszechna, Warszawa.

Suchodolski, B. (1974b). *Oświata i człowiek przyszłości*. Książka i Wiedza, Warszawa.

Suchodolski, B. (1974c). *Problemy wychowania w cywilizacji nowoczesnej*. PWN, Warszawa.

Suchodolski, B. (1979). *Kształt życia*. Nasza Księgarnia, Warszawa.

Suchodolski, B. (1980). *Dzieje kultury polskiej*. Interpress, Warszawa.

Suchodolski, B. (1983). *Wychowanie i strategia życia*. Wydawnictwa Szkolne i Pedagogiczne, Warszawa.

Suchodolski, B. (1987). *Wychowanie i strategie życia*. Wydawnictwo Szkolne i Pedagogiczne, Warszawa.

Suchodolski, B. (1990). *Wychowanie mimo wszystko*. Wydawnictwo Szkolne i Pedagogiczne, Warszawa.

Suchodolski, B. and Wojnar, I. (1972). *Nasza współczesność a wychowanie*. Nasza Księgarnia, Warszawa.

Suchodolski, B. and Wojnar, I. (1988). *Humanizm i edukacja humanistyczna: wybór tekstów*. Wydawnictwa Szkolne i Pedagogiczne, Warszawa.

Witalewska, H. (1992). Żegnając Profesora Suchodolskiego. *Głos Nauczycielski*, (42):4.

Wojnar, I. (1964). Bogdan Suchodolski. *Nauka Polska*, (1):75.

Wojnar, I. (1974). Profesor Bogdan Suchodolski. *Kwartalnik Pedagogiczny*, (4):291.

Wojnar, I. (1975). Profesor Bogdan Suchodolski. In Leśnodorski, B., editor, *Przeszłość przyszłości: księga ofiarowana Bogdanowi Suchodolskiemu*, page 389. Państwowy Instytut Wydawniczy, Warszawa.

Wojnar, I. (1993). Bogdan Suchodolski 1903 – 1992. *Nauka Polska*, (6):195.

Wojnar, I. (2010). *Bogdan Suchodolski*. Coleção Educadores. Fundação Joaquim Nabuco, Editora Massangana, Recife. http://www.dominiopublico.gov.br/pesquisa/DetalheObraDownload.do?select_action=&co_obra=205183&co_midia=2.

Wojnar, I. and Kubin, J., editors (2004). *Bogdan Suchodolski w stulecie urodzin – trwałość inspiracji*. PAN. Komitet Komitet Prognoz Polska 2000 Plus, Warszawa.

Wojnar, I., Kwiatkowska, H., and Kwieciński, Z., editors (1996). *Profesor Bogdan Suchodolski - jego filozofia, myśl pedagogiczna i działalność*. Polskie Towarzystwo Pedagogiczne, Warszawa.

Wołoszyn, S. (1996). Bogdan Suchodolski jako historyk myśli pedagogicznej. *Przegląd Historyczno - Oświatowy*, (3-4):247–250.

The Value Aspect of Student Youth Perception of Space and Time Categories

Svitlana P. Palamar[a], Natalia M. Golota[b], Liudmyla L. Nezhyva[c], Kateryna A. Brovko[d], and Maryna S. Naumenko[e]

Borys Grinchenko Kyiv University, I. Shamo Boulevard, 18/2, Kyiv, 02154, Ukraine
{*s.palamar, n.holota, l.nezhyva, k.brovko, m.naumenko*}*@kubg.edu.ua*

Keywords: Space, Time, Values of Life, Students.

Abstract: The article deals with the formation of the most important value orientations of modern youth. The authors substantiated the important role of the spatio-temporal component in the life of the individual, as orientation in space and time permeates all areas of human interaction with the outside world, contributing to the formation of worldview and ensuring health preservation. The results of the study of students' perception of various aspects of the categories "space" and "time" as well as the impact of everyday life on student youth are presented. Given the exceptional importance of space and time for human life, the article aims to establish how students are aware of the value aspects of the categories "space" and "time" in the process of influencing everyday reality on them. To achieve this goal it is necessary to solve the following tasks: to investigate in pedagogical sources the state of the problem of outlining the most important values in the formation of personality and their awareness of young people in the mastery of space and time; to determine the spatial and temporal frameworks through which the surrounding human lifeworld is perceived and empirically comprehended; to survey future teachers of preschool and primary education following the awareness of the value aspects of the categories of space and time.

1 INTRODUCTION

Today's stage of development of Ukrainian society is characterized by the transformation of socio-political processes and changes in values due to the search for their own path. These processes, undoubtedly, have made significant adjustments in the formation of value orientations of modern youth, their behavior, life aspirations. The time of study in a higher education institution is a period of personal development of a young person, the accumulation of not only professional but also life knowledge and skills, the formation of its interests and values, relevant norms and patterns of behavior.

A separate category is young people who have chosen the profession of teacher, because the future of society will depend on what values these teachers will instill in the younger generations. The modern educator is called not only to transfer specific knowledge to children but also to introduce them into the socio-cultural space, to involve them in the values of culture, to help them learn about the environment, to comprehend the realities of life. It is well-known that the education system as a socio-cultural institution of society contributes to the implementation of any changes in value orientations in it. Thus, the modernization of pedagogical education, in particular the orientation of teachers to meet the needs of a dynamically developing society, acquires special significance. It should be noted that today the educational space is considered as a space-time field of functioning and development of the education system as an open and active social sphere, in which the ideology of personality formation takes into account the conditions of the external environment.

Modern society is characterized by a high level of manufacturability of production processes, dynamic development of material, spiritual, communication and other spheres of life, which cause not only profound social consequences, but also lead to a change in people's perception of space and time. Orientation in space and time permeates all areas of human

[a] https://orcid.org/0000-0001-6123-241X
[b] https://orcid.org/0000-0003-3748-753X
[c] https://orcid.org/0000-0001-9520-0694
[d] https://orcid.org/0000-0001-8572-9316
[e] https://orcid.org/0000-0001-8927-4427

Palamar, S., Golota, N., Nezhyva, L., Brovko, K. and Naumenko, M.
The Value Aspect of Student Youth Perception of Space and Time Categories.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 21-30
ISBN: 978-989-758-579-1

interaction with the outside world, contributing to the formation of worldview, a certain life position, health, development of business qualities, and, ultimately, the formation of personality in general. The most active force of any society, which acts as a catalyst for change and plays an important role in its development, is the youth. Thus, the study of its worldview, life landmarks, factors that affect the formation of a young person, is an urgent problem.

The problem of forming a spiritually healthy personality occupies a prominent place in pedagogy and is always relevant, because you can build a strong family / modern society based on the established system of values. It contributes to the acquisition of mobility, culture of communication, erudition. According to Ohnev'yuk (2003), the determining factors of social adaptation of young people are "dominant social values, moral and psychological climate in society and value orientations of the person who adapts. It should also be borne in mind that the value structure of the consciousness of young people is in its infancy; it is significantly influenced by the diversity of processes taking place in society".

Traditionally, the highest values include health, family, love, kindness, freedom, work, truth, honor, duty, consciousness, knowledge, creativity, etc. However, speaking of higher values, which reflect the fundamental relationships and needs of people, are the foundation of the individual worldview, it is impossible to avoid such categories as space and time. Modern man actively interacts with all aspects of space and time, adapts to them, and assimilates them, trying to transform and master them.

Considering the importance of space and time for human's life, the article aims to establish how students realize the value aspects of the categories "space" and "time" in the process of influencing them in everyday reality. Throughout their lives, youth often immerse themselves in the virtual world and digital technologies, which, while having certain advantages, at the same time can somewhat distort the perception of the real world.

In order to achieve the set goal, the following tasks must be solved:

- to investigate in pedagogical sources the definition of the most important values in the formation of a personality, the problem of youth awareness of values in mastering space and time;
- to outline the space and time framework by which the surrounding life world of a person is perceived and empirically understood;
- to conduct a survey of future preschool and primary school teachers according to the awareness of the value aspects of the categories of space and time.

2 LITERATURE REVIEW

The concept of chronotope and its application for the study of temporal-spatial relations in research on learning and education was covered by Ritella et al. (2021). The authors have identified the dimensions of the analysis of chronotopic units, focusing on the material-discursive features and interdependence of space-time. In particular, it was demonstrated how the activation of one or more of these dimensions allowed to make "visible" educational processes, which allowed to focus on important aspects of pedagogical practice.

Kumpulainen and Rajala (2017) also rely on the concept of chronotope to explore how students create and manage the context of time-space during joint learning activities. Based on a dialogical approach, the study identified chronotopes as socially constructed space-time configurations with a specific narrative character, representing cultural practices and values that are embodied in an interactive situation.

Philosophers traditionally viewed existence as a broad concept of the world and at the same time they viewed the existence as independent from humans; the modern scientists view a person as the world of a special existence and view the world through human consciousness (Voropaeva, 2013). Spatiality is one of fundamental dimensions of human existence which builds the worldview and the activity of a human as a generic being (Bairachnyi, 2019).

In order to understand the essence of the problem outlined in the goal, it is necessary to identify the most important values in the formation of personality. According to Vlasenko (2015), moral values are the basis of consciousness. Morality is a person's ability to act, think, and feel in accordance with his spiritual origin.

Rohanova (2006) interprets spirituality as features of the mental organization of an individual, which is manifested in his sensory-emotional sphere and is decisive in the formation of personal traits, worldview, value orientations of a person, which determine his life aspirations, needs, activities, and more. Spiritual values reflect personality traits, the system of aspirations; it is an expression of needs that ensures the development of the social subject.

Bekh (2009) systematizes values as follows: the main values of life (ideas about the purpose and meaning of life, happiness); values of interpersonal

communication (honesty, friendliness); democratic values (human rights, freedom of speech, conscience, political freedoms); pragmatic values (personal success, entrepreneurship, desire for material wealth); spiritual values (worldview, moral, aesthetic, etc.).

Living space consists of external and internal. The phenomenon of psychological space is covered in the work of Havryliuk (2018). The author defined its categorical and conceptual content, as well as clarified the conceptual positions of definition of its determination, which laid the foundation for systematization of factors of its development (genetic characteristics of the individual, environmental influences, culture; social environment, individual human experience). Havryliuk (2018) presented scientific ideas about the content of external (sociocultural, environmental, economic) and internal (psychophysiological, individual psychological, personal, sociopsychological) factors of formation of the psychological space of personality and noted the impact of each of them on personal safety and comfort.

Living space as a structure defined by the system of human relations to the world is reflected in the work of Shwalb (2015). Understanding of various living spaces and ideas about their separate dimensions are developed in research of Tytarenko (2003). The psychological features of the formation of the personal space of student youth are discussed in the work of Koshyrets (2014).

Modern studies show that the scale and speed of the living space transformation now is so significant that not only individual humans but the whole society doesn't have time to deeply process its consequences, develop relevant strategies of minimising economical, political, ecological, psychological risks of the modern social and cultural space transformation (Ignatko, 2016).

Reforming educational processes is associated with European integration, so the formation of a comprehensively gifted individual becomes a priority for universities in the acquisition of moral values, spiritual growth. The student's value of self-determination as a result of the orientation of a special stage of axiologization can be called the central stage, which provides student orientation in the world of professional values, in time dimensions of past, present, and future (Nikogosyan and Aseyeyva, 2017).

The process of formation of values and value orientations depends on both external social and internal personal factors. Palamar (2018) analyzed the factors influencing the formation of value orientations of future teachers, identified the main value orientations of students in the formation of personality, revealed ways to form spiritual and moral values of students in the educational environment of the higher pedagogical institution (Palamar, 2017).

During the student years, a person actively masters various areas of life: studying in a higher education institution, work, communication of interests, personal relationships, building their own life strategy, etc. It is in adolescence that ideas about time pass to the highest level and approach the abstract reflection of the time, and personal experience, built on their own knowledge and continuity of perception of time, is a major factor in the formation of these ideas and concepts (Babatina, 2013).

3 RESULTS

Based on philosophical works, the categories of space and time are used in the study to denote the basic forms of existence. Space conveys a way of coexistence of various material formations, time – a way to change material phenomena. We also understand space and time as the primary universal intuitions, with the help of which the surrounding human life-world is perceived and empirically comprehended.

Space and time are mandatory components of the whole content of human perception, which since the early '90s of the twentieth century is called the field of perception. Like space, time is a special way of distinguishing objects. The combination of these two categories, i.e. the change of position in space together with the change in time, is the main way to obtain ideas about the phenomena and objects of the environment. The ability to perceive things separately, consistently is an extremely important feature of conscious life.

Understanding the research sources in philosophy, pedagogy, and psychology makes it possible to observe students' awareness of the category of space in dimensions: internal – external, personal (psychological) – social, real – virtual (information and communication), as well as time categories in the dimensions of the present, past, and future, ephemerality of time, personal time, the impact of ICT on saving time, creativity / time.

Given the exceptional importance of space and time for human life, we tried to establish how students perceive different aspects of the categories "space" and "time", how everyday reality affects students and how students affect it, how young people generally interpret space and time as values of their existence. For this purpose, a survey of full-time students studying on "Preschool Education" and "Primary Education" of the Pedagogical Institute of Borys Grinchenko Kyiv University was conducted.

Answering the questionnaire about the importance of social space (order and interaction of certain social ties and processes, social relations, their saturation, density) for their personal development, 1st-year students noted that this space ensures human involvement in the community of others, thus satisfying its social needs (48%), makes others feel needed (8%), outlines the prospect of participating in social processes (18%), and provides an opportunity to influence others: family, friends, relatives, future students to form their worldview (26%); 2nd-year students answered accordingly: 1 – 46%, 2 – 10%, 3 – 20%, 4 – 30%); the answers of 3rd-year students in percentage were as follows: 1 – 50%, 2 – 15%, 3 – 25%, 4 – 22%, which is shown in figure 1.

Further communication with students showed that young people, especially noting their personal responsibility for the realization of their own aspirations in the social aspect of space, realize the importance of their existence in the world of objects and natural environment: man exists among objects and phenomena, while being part of living nature and obeying natural biorhythms. At the same time, the students admitted that modern young people are becoming increasingly alienated from nature – for them, it becomes essential to immerse not only in social connections but also in the virtual world, vanity. Unfortunately, only 32% of students associate with it such health problems as insomnia, internal anxiety, etc. However, realizing the importance of the natural environment and the organic existence of man in it, young people prefer social space, the relationships that occur in both real-life and virtual. That is, the natural aspect of space-time existence and human development becomes secondary for young people. According to our research, 27% of future teachers are aware that each event as a significant interaction, an important moment in life, occurs in both temporal and spatial dimensions, requires the involvement of certain resources, and can lead to both positive and negative consequences. Our study found that the vast majority of young people (94%) realize that the social space is not only the present in which their lives take place, namely social, economic, political, and other events but also the past and future. It is interesting that realizing the value of the past in modern social life, expressed in traditions, attitudes, 67% of students consider it insufficient in today's differentiated and stratified society: each social group has its own social space, which often does not take into account the value of the past and does not focus on them.

Given the fact that within the social space and under its influence is the psychological space of the individual, which changes the characteristics of social space, the next question in the questionnaire was: "What is the value of your own psychological space for you" (the space of the individual's life world). Answering this question, students noted that it is important for them, first of all, as a psychologically comfortable environment (48%), where they can relax, communicate with family and friends; as an environment where a person feels comfortable in solitude, and among people pleasant to him (34%), the opportunity to be alone with their thoughts and experiences (18%); 2nd-year students answered accordingly: 1 – 50%, 2 – 38%, 3 – 22%; and for 3rd-year students the answers were as follows: 1 – 55%, 2 – 45%, 3 – 20% (figure 2).

Further clarification of students' positions on their awareness of the importance of their own living space showed that they attach great importance to meaningful relationships, as well as the presence in the circle of people with similar views on life values: family, love, health, education, have a common hobby. Young people especially noted that it is very valuable for them to have people in their close living space who contribute to their self-realization (68%). 22% of students expressed fears of having people around them who may in some way limit and hinder their self-realization. 10% of students said that they value their own living space as the space of their life, as their own way of constructing their existence; 2nd-year students answered accordingly: 1 – 70%, 2 – 25%, 3 – 15%; 3rd-year students had the following answers: 1 – 65%, 2 – 20%, 3 – 20% (figure 3).

Analyzing young people's perceptions of their own living space, we found that all students (100%) believe that with the beginning of student life it has undergone significant transformations, and different student groups have interpreted these transformations differently. Thus, 63% of students who entered the Institute from other cities of Ukraine, said that their social space has expanded significantly due to classmates, teachers, dormitory neighbors, change of residence, building personal relationships. However, 37% of non-resident students noted that even though they found new friends while studying, a loved one, their circle of friends included classmates, teachers, they generally consider their social space as expanded and somewhat narrowed at the same time: their parents, relatives and childhood friends are far away, communication with them "in real life" appeared to be not often; they are also tied to the place where they were born and raised.

The young people noted that with the help of modern means of communication, which allow them to communicate at a distance, their living space does not seem to change, because there are relatives and close

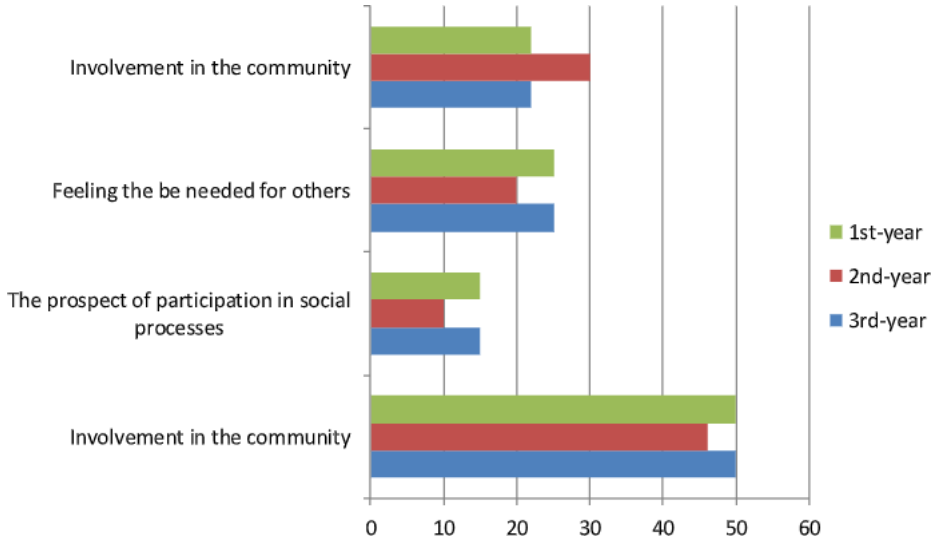


Figure 1: The importance of social space for the personal development of students.

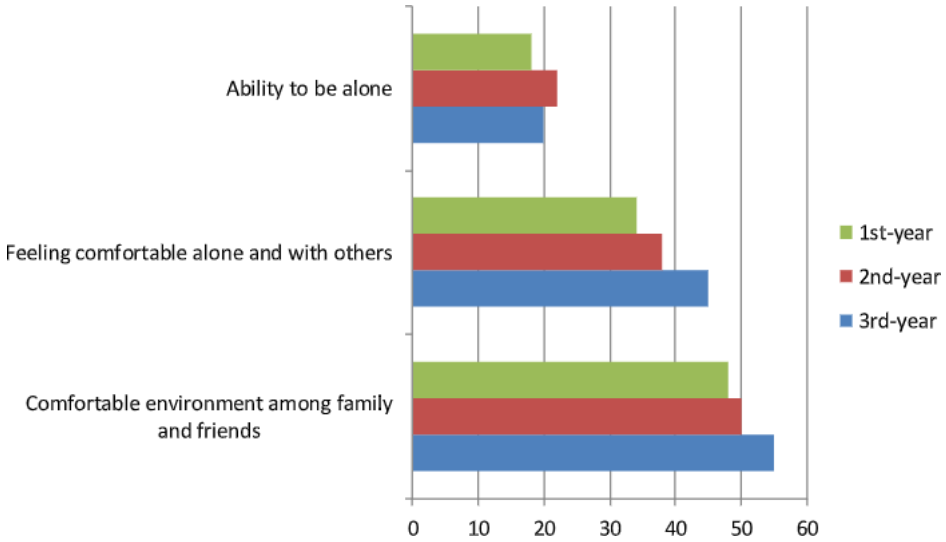


Figure 2: The value of one's own psychological space.

people who are far away, but stated that they lack direct communication.

At the same time, analyzing their living space, students focused mainly on current events and experiences, ignoring that the life-world of the individual is not only "here and now", but also the past of the person, his focus on the future. Namely, defining their own space of life as very important, valuable for them, first of all, the presence of particularly important relationships and the possibility of self-realization, creating their own lives, students put the essence of space, not time.

Defining the value of social time as a form of society that reflects the duration of historical processes, their changes in the process of human activity, and its impact on a particular individual, students in the vast majority (92%) noted that they live in a time characterized by rapid social events, a powerful development of society, production processes, but noted that the dynamism of life, on the one hand, stimulates a person to meet social aspirations, to strive for further achievements, on the other – a person trying to meet the growing demands of society, risks depriving himself of something significant in the personal sense.

Answering the question on the importance of personal (own) time for them, young people answered that every second, minute, an hour of their life is important for them, because it allows them to learn something new, to develop, to experience different feelings (37%). 44% of respondents said that the

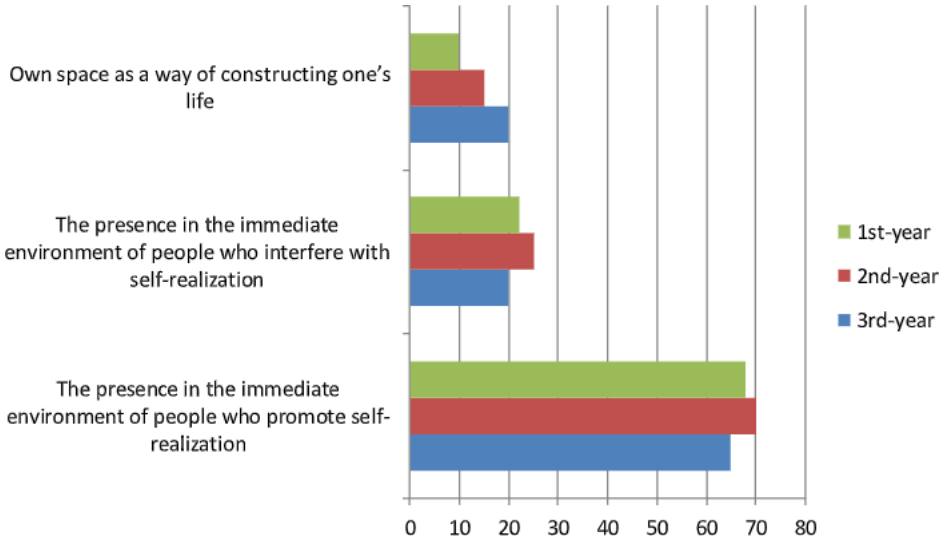


Figure 3: Awareness of the importance of their own living space.

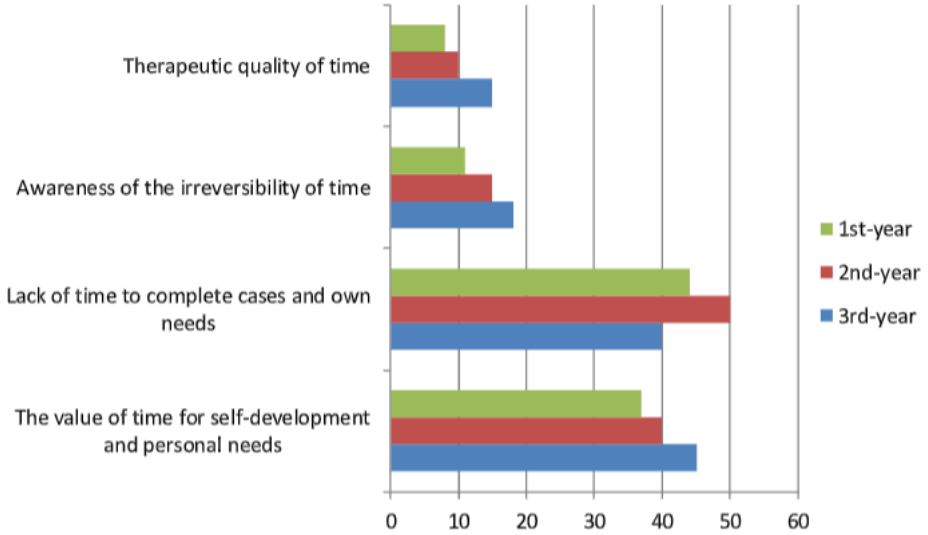


Figure 4: Significance of personal time for students.

value of time for an individual in modern society is that it is constantly not enough to complete all the planned tasks and meet their own needs. 11% of students said that the special value of time for each person is that it cannot be returned, to live again, and therefore one should especially value every minute of his life, in which the loved ones, interesting things, and events are present. 8% noted such an important quality of experiencing time as its "therapeutic" nature: "Time "cures" after tragic, unpleasant events and allows you to look at a life lived from a different angle". 2nd-year students answered accordingly: 1 – 40%, 2 – 50%, 3 – 15%, 4 – 10%; in the 3rd-year students the answers in percentage were as follows: 1 – 45%, 2 – 40%, 3 – 18%, 4 – 15%. The results of the survey of students on the importance of personal time are shown in figure 4.

The majority of students (52%) who came to study at the Institute from other cities, noted that with the move to a big city and the beginning of student life, the feeling of time has changed: it passes quicker, events change at a kaleidoscopic speed. Thus, it is difficult to focus on life necessary, really important things; there is a risk of spraying forces on minor things. 48% also said that they feel the accelerated pace of life, dynamic development and rapid change of events, but they attribute this fact not to life in the metropolis, but in general to the modern rhythm of life, the need to adapt to the conditions and requirements of modern society. 27% of respondents

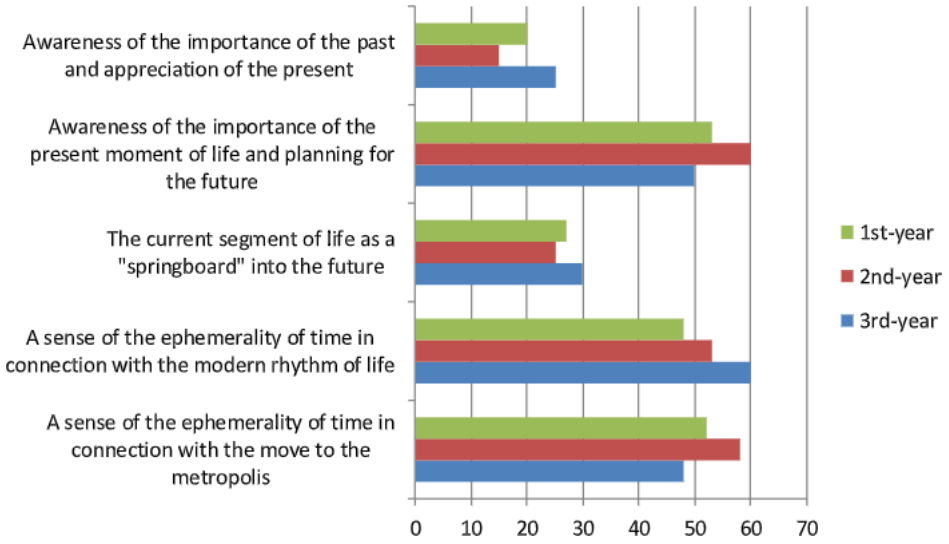


Figure 5: The value of the past, present and future for students.

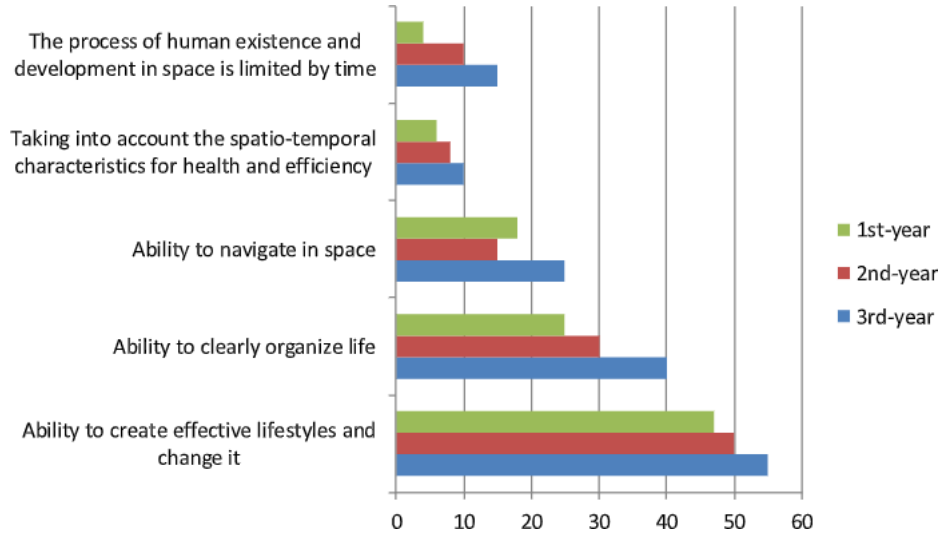


Figure 6: The value of ideas about space and time in the life of modern person.

said that the current segment of life is seen more as a "springboard" into the future, every minute of life is used for self-realization, caring for future success, and happy life. 53% said that they worry about the future, the dream of success in life, hoping for professional self-realization, building a happy family life, but at the same time do not want to lose the importance of the present moments of life. Students of this group noted that the future worries them and is also extremely valuable, but if you conquer your aspirations, actions only in anticipation of future events, you can lose something really important in present life. 20% of respondents said that their past life, filled with pleasant memories and experiences, was and remains important and valuable for them, but they highly value their current life, which gave them a new social role, new friends. 2nd-year students answered accordingly: 1 – 58%, 2 – 53%, 3 – 25%, 4 – 60%, 5 – 15%; 3rd-year students as follows: 1 – 48%, 2 – 60%, 3 – 30%, 4 – 50%, 5 – 25% (figure 5).

Thus, we can say that for the modern young person his past, which lives in the memories and influenced the formation of personality is quite valuable, but one is more focused on the present moments of life, living "here and now" while focusing on the future.

Students who are more organized and focused, better able to organize the course of their lives, value their own time and the time of others, plan activities, taking into account not only time constraints but also

their own real opportunities, can separate the main from the secondary, so manage much more than others. Less organized students often scatter their efforts between necessary and secondary matters, complaining about lack of time.

Almost all respondents (97%) noted the importance of modern information and communication technologies to save time: they can be used to prepare for classes and perform work remotely, communicate with family and friends without wasting time on the road; work with electronic training courses created by teachers of the Institute at a convenient time. At the same time, 64% of respondents stated that such an opportunity, helping to save time, in some way limits their living space: replacing live communication, interaction "in real life", virtual relationships.

Answering the question on the importance of ideas about space and time in modern life, a significant proportion of respondents (47%) first mentioned the ability to create an effective, appropriate living space and change it according to their own needs, and secondly – the ability to clearly organize their own lives (25%), then noted: "the ability to navigate in space – without it, a person will not be able to move independently, especially in the metropolis" (18%) and "taking into account the spatio-temporal characteristics of life helps to understand the need for alternating different activities to maintain health and efficiency" (6%). Only 4% of students said that, even though space is saturated with various objects, events, phenomena, as well as the process of the development and existence of man occurs in time and is limited by it. The answers of 2nd-year students in percentage were as follows: 1 – 50%, 2 – 30%, 3 – 15%, 4 – 8%, 5 – 10%; the 3rd-year students answered accordingly: 1 – 55%, 2 – 40%, 3 – 25%, 4 – 10%, 5 – 15% (figure 6).

The vast majority of future teachers – 98% said that the formation of these ideas depends on the formation of the child's personality from the first years of life: orienteering, success in mastering various activities, including reading, writing, drawing, design, work; and in the future – the development of human business qualities: clarity of action, the ability to plan activities in accordance with time constraints, which will ensure its mobility and competitiveness in the future.

It was also important for us to establish: how the feeling of space and time affects the formation of students' creativity. In the context of the study of this aspect, we found that 87% of students said that they need more space and time to fully express their creativity. However, when clarifying these positions, it was found that young people, first of all, consider personally comfortable space important for the manifestations of creativity, i.e. one did not indicate its narrowing or expansion, however noted its comfort – thus, students indicated the psychologically important qualities of the environment: there might be a large number of people in it, but the main thing is how outsiders perceive and (what is especially important, if they approve) the discovery of creativity. Regarding the time aspect – 56% of students said that they need more time to realize their creative aspirations. At the same time, 44% of students indicated that both for the full manifestation of creative abilities and for the implementation of creative ideas the part of the day (not specially a period of time) is significantly important to them: for some young people morning is the most productive in this aspect, for others – the second half of the day: drowsiness and a certain "inhibition" caused by fatigue disappear, inspiration and the desire not only to realize the plan but also to demonstrate their capabilities to friends, to feel their approval and admiration, appear.

4 CONCLUSIONS

The study of the perception of different aspects of the categories of "space" and "time" by full-time students studying on "Preschool Education" and "Primary Education" of the Pedagogical Institute of Borys Grinchenko Kyiv University allows us to draw the following conclusions:

Almost half of the students realize that a person's social space provides involvement in the community, meeting social needs, a quarter of students surveyed believe that this space provides an opportunity to influence others, including future students to shape their worldview. Young people are aware of their personal responsibility for the realization of their own aspirations in the social space, maintaining harmony with nature and the environment.

Students see the value of their own psychological space in establishing psychological comfort, mental balance, establishing communication with family, friends, and colleagues. In their own living space, students attach great importance to relationships with others, finding like-minded people concerning their life values (family, love, health, education, leisure, etc.), as well as people who will contribute to the realization of life or creative credo.

In their answers, the students focused on current events and experiences, lagging behind the past and the future, preferring space to time. At the same time, young people understand the value of social time as a form of society and its impact on a particular individ-

ual, characterize modernity with rapid social events, a powerful development of society, production processes, understand the risks of loss in the personal sense.

Students stated the importance of personal (own) time for cognition, personal development, experience, and expression of feelings. They noted the ephemerality and irreversibility of time. However, a significant number of students understand the importance of retrospective time in the context of the experience.

According to the results of the study, the dynamics of the events of a young person's life, his ability to perceive time and realize it as the value of life depends on the type of his personality, the ability to direct, accelerate, and sometimes slow down his own life.

Many of the surveyed students, expressing their ideas about space and time in the life of modern man, noted the possibility of creating an effective, appropriate space for life and change it for the better, stressed the need to clearly organize their own lives for health preservation.

Thus, the analysis of students' awareness of the categories of space and time as values of existence shows that young people perceive them as having a decisive influence on the quality and success of their existence and the existence of society in general. Realizing the importance of social space and time, students are aware of their own psychological (personal) space and their own time, interpreting them as space and time of their life as the most important.

The results obtained in the research process will be useful to mentors and psychologists in organizing adaptation measures for students with the aim of their successful integration not only into student life, but also life in a big city; will help young people to focus on awareness of their life orientations and, if necessary, their correction.

REFERENCES

Babatina, S. I. (2013). Peculiarities of time perception and experience of students on the stage of adaptation and identification. *Nauka i osvita*, (7):120–125. http://nbuv.gov.ua/UJRN/NiO_2013_7_28.

Bairachnyi, V. O. (2019). The conceptual and ontological foundations of the social space. *Vìsnik Harkìvs'kogo Nacìonal'nogo Pedagogìčnogo Unìversitetu ìmenì G.S. Skovorodi. Fìlosofiâ*, 1(46):236–249. http://journals.hnpu.edu.ua/index.php/philosophy/article/view/1581.

Bekh, I. D. (2009). Zhyttia osobystosti u vymiri dukhovnosti. *Teoretyko-metodychni problemy vykhovannia ditei ta uchnivskoi molodi*, 13(1):3–16. https://lib.iitta.gov.ua/3796/.

Havryliuk, I. (2018). Psychological Space of a Personality: Psychological Factors System of Formation. *Psychological Prospects Journal*, (32):60–72. https://doi.org/10.29038/2227-1376-2018-32-60-72.

Ignatko, V. (2016). Value priorities of human living space of industrial and post-industrial era. *Hileya: naukovyy visnyk*, (115(12)):175–179. http://gileya.org/download.php?id=139.

Koshyrets, V. V. (2014). *Psychological peculiarities of the personality space formation of the student youth*. Dissertation for Degree of the Candidate of Science in Psychology, specialty 19.00.07 – Pedagogical and Developmental Psychology, National University of Ostroh Academy, Ostroh.

Kumpulainen, K. and Rajala, A. (2017). Negotiating time-space contexts in students' technology-mediated interaction during a collaborative learning activity. *International Journal of Educational Research*, 84:90–99. https://doi.org/10.1016/j.ijer.2016.05.002.

Nikogosyan, L. and Aseyeyva, Y. (2017). Axiological approach in future medical specialists' training. *Science and Education*, (4):33–38. https://doi.org/10.24195/2414-4665-2017-4-6.

Ohnev'yuk, V. O. (2003). *Osvita v systemi tsinnostei staloho liudskoho rozvytku [Education in the system of values of sustainable human development]*. Znannia Ukainy, Kyiv. https://library.megu.edu.ua:9443/jspui/handle/123456789/2486.

Palamar, S. (2017). The problem of forming the spiritual-moral values of students in the conditions of the educational environment. *Educological discourse*, (3-4 (18-19)):221–234. http://nbuv.gov.ua/UJRN/osdys_2017_3-4_20.

Palamar, S. (2018). Value initiatives of future teachers as a preference for integration to the european educational space. *Educological discourse*, (3-4 (22-23)):129–138. 10.28925/2312-5829.2018.3-4.31675.

Ritella, G., Rajala, A., and Renshaw, P. (2021). Using chronotope to research the space-time relations of learning and education: Dimensions of the unit of analysis. *Learning, Culture and Social Interaction*, 31:100381. https://doi.org/10.1016/j.lcsi.2020.100381.

Rohanova, M. (2006). Development of higher school students' spiritual and moral values as a pedagogical issue. *Visnyk of the Lviv University. Series Pedagogics*, 21(1):98–103. http://publications.lnu.edu.ua/bulletins/index.php/pedagogics/article/view/5982.

Shwalb, J. M. (2015). Space-psychological organization of the environment of being and of the life activity. *Aktualni problemy psykholohii*, 7(40):198–207. http://nbuv.gov.ua/UJRN/appsuh_2015_7_40_21.

Tytarenko, T. M. (2003). *Zhyttievyi svit osobystosti: u mezhakh i za mezhamy budennosti [The life world of the individual: within and outside of everyday life]*. Lybid, Kyiv. https://www.academia.edu/31121046/.

Vlasenko, O. M. (2015). Problema formuvannia moralno-patriotychnykh tsinnostei studentiv v umovakh osvitno-vykhovnoho seredovyshcha vyshchoho navchalnoho zakladu. http://eprints.zu.edu.ua/19781/.

Voropaeva, V. (2013). Ontological foundations of human culture as the highest values being. *Humanities Bulletin of Zaporizhzhe State Engineering Academy*, (54):251–265. https://old-zdia.znu.edu.ua/gazeta/visnik_54_251.pdf.

Cadets' Psychological Readiness Formation Program in the National Guard of Ukraine to Use Firearms in Professional Spheres

Ihor O. Atamanenko[1][a], Oksana K. Kornosenko[2][b], Oksana V. Danysko[2][c] and Maya S. Serhiienko[3][d]

[1]*The National Academy of the National Guard of Ukraine, 3 Zakhysnykiv Ukrainy Sq., Kharkiv, 61001, Ukraine*

[2]*Poltava V. G. Korolenko National Pedagogical University, 2 Ostrohradskoho Str., Poltava, 36003, Ukraine*

[3]*Donbas State Pedagogical University, 19 Henerala Batiuka Str., Sloviansk, 84116, Ukraine*

atamanenko1512@gmail.com, kornosenko@ukr.net, oksana.danisko76@gmail.com, mayasergienko@ukr.net

Keywords: Psychological Readiness, Firearms Training, Military Personnel, Combat Readiness, Stress Management, Emotion Regulation, Self-Regulation, Autonomic Nervous System, Heart Rate, Respiration Rate, Extreme Conditions, National Guard of Ukraine, Nervous System Strength, Psychological Skills Training.

Abstract: The imperfection of psychological training methods and psychological training programs of cadets of the National Guard of Ukraine (NGU) determines the study's relevance. The study's purpose is to develop and implement a program of psychological training for firearms use during the training process of NGU cadets; to diagnose the activity of the departments of the autonomic nervous system, according to indicators: heart rate and breathing rate; to reveal or refute the correlation between the strength of the nervous system and the success level of NGU cadets during training shooting; to examine the program's effectiveness in maintaining and strengthening the nervous system force of cadets. Methods of research include analysis, synthesis, modeling, programming, pedagogical observation, and methods of expert evaluation. The program consists of three stages: motivational, basic, and restoring, and aims at forming a positive motivation to use firearms in extreme conditions, improving the state of pre-situational readiness, optimal combat state, and transition from one state to another, and working out the action strategy under the influence of stressful factors during service and combat activity. After differentiating the heart rate and breathing data for all groups, a relationship between the level of cadets' psychological readiness and indicators of autonomic changes was revealed: on average, 50% of the total number of cadets are individuals who have accelerated breathing and heart rate during the period of shooting conditions, with 46% of them are groups with an average and low level of success in shooting. The psychological training program is effective in supporting and strengthening the cadets' strong nervous system, but only a marginally weak one.

1 INTRODUCTION

A full-scale war on the territory of Ukraine increased the resource needs for weapons and human capital. The high level of Ukrainian militaries motivation is due to a personal and patriotic desire to liberate Ukrainian lands from Russian invaders. However, the emotional passion caused by the rage of Ukrainian militaries towards the occupiers can negatively affect the course of events in stressful situations. Therefore, the important factor in the professional training of future officers of the National Guard of Ukraine (NGU) is the formation of psychological readiness to use firearms.

The psychological training of military personnel is a process of purposeful mental qualities formation to ensure a persistent performance of combat and service tasks in various conditions. The effectiveness of professional readiness should be evaluated by the temporal, quantitative, and qualitative indicators of specified task realization, certainly, and certainly to include as a component methods and actions in the conditions of stress factors simulation, which is typical for actual circumstances of extreme service and combat task realization. According to the requirements, the professional training of officers (NGU) should be conducted like a simulated combat mission, and all stressful fac-

[a] https://orcid.org/0000-0001-8959-5423
[b] https://orcid.org/0000-0002-9376-176X
[c] https://orcid.org/0000-0003-4040-562X
[d] https://orcid.org/0000-0001-5511-5030

Atamanenko, I., Kornosenko, O., Danysko, O. and Serhiienko, M.
Cadets' Psychological Readiness Formation Program in the National Guard of Ukraine to Use Firearms in Professional Spheres.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 31-40
ISBN: 978-989-758-579-1

tors that may hypothetically appear during the service and combat activity should be considered. During the psychological training, it is important to teach future officers to act in perceived danger situations, to overcome stress, and to take reasonable risks. At the same time, it should be noted that the professional training system of NGU future officers does not fully take into account the influence of individual and psychological features of military personnel on the service and combat activity. The methods of forming psychological readiness for the firearms using have also been researched in part.

The experience of teaching and military activity allowed us to detect deficiencies of psychological training, i.e.:

- the psychological training is not highlighted as an independent type of training, so it does not provide an opportunity to use it taking into account the peculiarities of the NGU future officers' psychology and their behavioral reactions;
- the methods of training NGU future officers were artificially limited;
- the necessary to form the individual psychological qualities among cadets is ignored;
- the tactical features of NGU cadets' actions in extreme conditions are not taken into account during working out the practical part of task training.

To solve the outlined problems it is necessary to form several research tasks:

1. To develop, justify, and implement in the professional training of the NGU cadets a program to form a psychological readiness for firearms use.
2. To diagnose the activity of the autonomic nervous system, such as heart rate and breathing rate, during firing from a Makarov pistol.
3. To reveal or refute the correlation between the strength of the nervous system and the level of NGU cadets' success at the time of using firearms during training shootings.
4. To check the program regarding the possibilities of supporting and strengthening the nervous system force of cadets for effectiveness.

2 LITERATURE REVIEW

The analysis of the latest publications, according to this study topic, indicates a high level of interest among scientists to the problem of psychological readiness of military personnel during the performance of service and combat tasks, in particular, behavioral and physiological reactions in a state of stress. In particular, Sekel et al. (2023) note that the military tactical adaptive decision-making during the simulations of military operational stress depends on personality, resilience, aerobic, and neurocognitive functions. Laboratory studies based on the simulation of combat operations or a military field training duration of 48 hours. Laboratory studies experimentally prove that military operational stress negatively influences the physical, cognitive, and emotional soldier's efficiency during simulation, in particular, the adoption of military tactical adaptive decisions.

Koltun et al. (2023) identify the physiological and psychological stressors that may impair military readiness and military efficiency during military training and under operational conditions. During the experiment we had the obtained data. According to it, we may point out that military personnel, who are in a state of stress, lose their ability to the aerobic endurance and adequate decision-making, i.e., reduce their cognitive performance.

Flood and Keegan (2022) note that military personnel often perform complex cognitive operations under unique conditions of high stress. Cognitive impairment as a result of this stress can have serious consequences for the success of military operations and the well-being of military personnel, especially in combat environments. Therefore, during military training, it needs to understand the feeling, stress resistance, and the degree of impaired cognitive functions. The study highlights the experience of overcoming psychological stress among military personnel in the framework of the transactional theory of stress.

Nassif et al. (2021) notes that mental skills, such as focus and emotion management, are essential for optimal performance in high-stress occupations, including the military. To examine the impact of mindfulness training on operational performance, mental skills, and psychological health, a short-form program, Mindfulness-Based Attention Training, was delivered to active duty soldiers as part of two randomized trials. As a result, the proposed program turned out to be effective and suitable to optimize the operational indicators of the body's response to stress factors and improve mental skills in military forces.

Lytvyn and Rudenko (2021) give grounds for the necessity of introducing into the educational process of higher educational institutions of the State Emergency Service the pedagogical system of formation of cadets' readiness for professional activity and the expediency of creating appropriate psychological and pedagogical conditions for increasing the effectiveness of this process (continuous improvement of the

pedagogical skills of the teaching staff; active use of innovative service and combat experience of fire and rescue formations; improving psychological training by modeling stressors that affect personnel in hazardous circumstances and extreme situations; taking into account the individual psychological characteristics of cadets; moral and material stimulation of cadets' activity in ordinary and, especially, in extreme situations related to risk to life), aimed at ensuring their optimal preparedness to work in risky (extreme) circumstances.

Taylor et al. (2011) call attention of the scientific community to the problem of training psychological skills in a military survival school. A randomized field research aimed to examine the effects of short-term stress training to teach arousal control through self-talk in individual 40-minute sessions. Stress symptoms were then assessed during a mock-captivity phase of training, as well as 24 hours, 1 month, and 3 months after completion of training. Survival training precipitated remarkable increases in subjective distress, but few substantive group differences emerged.

We were greatly interested in the article by McCrory et al. (2013). The study tested the hypothesis that multimodal psychological skills training would increase the self-regulatory behavior of military pilot trainees. The results showed linearity according to the improvement of specific self-regulation. Similarly, there was a significant increase in self-efficacy and psychological skills use, as well as, a concomitant decrease in anxiety and worry, highlighting the potential for modifying the cognitive and behavioral strategies of pilot trainees to maintain motivation to learn and improve individual/group responsiveness.

Kolesnichenko et al. (2016) investigated the psychological readiness of the servicemen of the National Guard of Ukraine to take risks, in particular, substantiated its content and structure, characterized the levels that are the basis of the psychodiagnostic methodology. The methodology has such scales as the manifestation of willpower, military camaraderie, professional identity, and self-control and meets the requirements of reliability and validity.

Kyrychenko (2020) highlights different approaches of researchers to solve the problem of servicemen's psychological readiness of airborne assault troops to conduct combat operations. Based on the analysis of the conditions and specific using of airborne assault troops, the peculiarities of the servicemen's psychological readiness to operate in combat conditions were analyzed.

A detailed analysis of the special literature proves that the problem of forming psychological readiness among the military personnel is an actual one. A significant scientific contribution of scientists reveals the theoretical and methodical features of military personnel training and their behavioral reactions in the situation of overcoming stress. However, it should be noted that the problem of the psychological readiness forming among future officers of the National Guard of Ukraine is insufficiently studied and needs to be addressed in the framework of the weapons using as the course of training and as the service and combat task realization.

3 MATERIALS AND METHODS

To solve the tasks, we developed a program to form the psychological readiness of NGU cadets to use firearms in their professional activities. The development and implementation of the program required the use of the following research methods: the analysis was used to study the special literature and levels of cadets' psychological readiness to use weapons; synthesis to integrate the stages of the program and its elements into a single system; the simulation technique involved the creation of a conditional model of a successful cadet who effectively uses weapons for combat task realization; the programming technique was used to develop the psychological readiness program for future NGU cadets; pedagogical observation and oral survey were carried out for systematic analysis and assessment of individual perception of influence methods on the future cadet's mind without interfering in this process; expert evaluation method.

The expert evaluation method was used to determine the level of quality of the cadets' actions, their mental state, and the results of shooting. According to the conditions of the shooting course, we surveyed and divided the respondents into three groups with different numbers of people (table 1).

The first group consisted of cadets who showed high results and received an "excellent" rating for the exercise. The cadets' actions in this group were confidence, accuracy, thoughtfulness, and coherence. They

Table 1: Quantitative indicators of the cadets' distribution by groups with different levels of success in training exercises with a Makarov pistol.

Group of cadets	Result, %
The first group had a high level of success in shooting (n = 36)	20
The second group had an average level of success in shooting (n = 106)	58
The third group had a low level of success in shooting (n = 40)	22

were attentive and focused on performing training exercises with the Makarov pistol while receiving the task and its execution. The second group of cadets showed average results and received a "good" or "satisfactory" rating during the exercise. Minor mistakes were observed in their actions, but outwardly, mental tension was visible. The third group consisted of cadets who showed low results and received "satisfactory" and "unsatisfactory" grades during the exercise. Representatives of this group made serious mistakes during practice shooting with the Makarov pistol. They were unable to execute the firing instructor's commands due to lack of confidence and attention. The cadets were distinguished visually by their pronounced paleness, dilated pupils and eyes, and physical weakness.

We carried out a diagnosis of the activity of the departments of the autonomic nervous system in the cadets in the process of conducting activities to check the implemented program of psychological training. Such indicators as heart rate and respiratory rate were diagnosed. Diagnostics of indicators were carried out in three stages (the first was before the start of the shooting, the second was during the shooting, and the third was 20 minutes after the shooting). The implementation of the experimental program was carried out during the training of senior cadets for 6 months (September, October, and November 2022 and March, April, and May 2023).

4 RESULTS AND DISCUSSION

The results of our research point out it is necessary to provide measures that fully cover the formation of psychological training components for future officers to use weapons in combat conditions during the psychological training process. Such an approach can be implemented only with the systematic planning of psychological training, which, from our opinion of view, is possible during the preparation of a program that includes measures to influence emotional, motivational and intellectual components, and the level of personal anxiety.

Psychological shooter training is an educational process aimed to form an optimal psychological state and persistent internal readiness for the effective use of firearms, with uncertain conditions of psychological and traumatic factors. The process of psychological training focuses on the formed following qualities of the NGU future officers:

- the ability to influence oneself, to abstract from various extraneous factors that interfere to make an accurate shot;
- the ability to concentrate one's attention, to focus on the main shooting aim, i.e. hitting the target;
- the self-confidence, perseverance, resourcefulness, initiative;
- the resistance of the central nervous system to the influence of stress factors;
- the ability to use autogenic and ideomotor techniques to relieve emotional tension.

Implementation of the training program outlines the most training lessons in the field, during tactical, special, and firearms training. For this, an instructor should acquire the interdisciplinary knowledge and skills. These tasks are solved during the NGU cadets' psychological readiness formation to use firearms. Based on these tasks, three periods of the program were defined: I – motivational; II – main; III – restorative.

The first period is motivational, the following tasks are:

- to determine the initial level of psychological readiness formation of NGU cadets in the period using firearms and differentiate them into groups with low, medium and high levels;
- to form positive motivation, the necessary attitudes for training according to the development of psychological readiness for firearms using;
- to increase the cadets' ability to relax, to mutually transition from a wait state to alert status;
- to contribute to the development of cadet's self-identification and self-determination, the reasons, goals and tasks for the of the Special Combat Task execution;
- to reveal the hidden possibilities of the human mind and ways of managing them;
- to form among the cadets a system of initial concepts and knowledge regarding psychological readiness to use firearms in the service and combat conditions and methods of increasing its effectiveness.

The main purpose of this period is the formation of cadets' positive motivation in regarding the formation of their psychological readiness to use firearms in extreme conditions. This purpose should be related to the development of cadets' sustainable motivation and self-education and self-improvement interest during firearms and physical training classes; to trust the teacher who conducts classes; strong discipline during training and strong self-discipline during the self-preparation; to ensure psychologically comfortable microclimate in the group. Professional psychologists and instructors who have experience in using

firearms in extreme conditions should be conducted of classes.

One of the important tasks at the first period is the formation of future officers' skills in voluntary mental self-regulation, during the group training and self-preparation after the classes. It is necessary to hold lectures to explain cadets the peculiarities of military activity, possible negative consequences of the stress factors influence that are linked with this activity, methods and methods that allow to increase resistance to the influence of psychological traumatic factors and ways to preserve the ability to work in extreme situations. The topics of lectures should have a professional and applied psychological orientation: "Specifics of extreme conditions during military and combat activity of NGU officers", "Psychological readiness of NGU officers to use weapons in conditions of military and combat activity", "Technologies of NGU officers activity during the firearms using in extreme conditions", "Methods and means of mental self-regulation in periods of negative emotional states caused by the performance of military and combat activity", etc.

It is necessary to hold lectures to explain cadets the importance of the ability to resist the negative impact of stress factors and the need to improve psychological resistance to the use of firearms in the conditions of service and combat activity. After a series of lectures, cadets should be recommended to independently improve the techniques and skills of mental regulation of adverse emotional states, as well as familiarize themselves with special literature.

The techniques and methods of mental regulation in the situation of adverse psychological states for the formation of the skills of voluntary self-regulation and self-control, the state of pre-situational psychological readiness for action should be studied by cadets after the lecture course. The method of neuromuscular relaxation proposed by Jacobson (1925) is used for training. The purpose of Jacobson's progressive muscle relaxation is to induce a relaxation response. The method helps to relax the body and change the active state of the body to a calm one. The learning process consists of three periods. In the first stage, cadets learn to realize and feel weak muscle tension and purposeful relaxation of the muscles responsible for bending all parts of the body. In the second stage, cadets learn differentiated relaxation to relax muscles that are not involved in supporting the body in a vertical position (stabilizer muscles). At the third stage, cadets learn to purposefully reduce and then remove local muscle tension, to transition from a state of waiting to combat readiness in extreme situations.

The initial training period must be carried out with the head of training to increase the training effectiveness and avoid mistakes. Cadets will learn about the principles of mental self-regulation: operational independence, and striving for improvement before conducting classes using this method. It is clarified the reason for the need to be able to concentrate and keep one's attention on the object, to keep a visual image concentrated in one's imagination, to feel and imagine the actions of verbal formulations, to arbitrarily relax the muscles, to influence oneself at the moment of lowering the level of mental tension. Cadets should pay attention to the general algorithm of actions; in this algorithm, each cadet can change individual elements, and include his own techniques in it to effectively use personally for himself. Techniques will be useful under conditions that correspond to a specific mental state. Therefore, it is important to be able to understand, analyze and remember your mental state, using any reference points for this: heart rate, muscle sensations, breathing rate, etc.

The total duration of the full training cycle by this method is 20-25 minutes. Depending on the improvement of voluntary mental self-regulation skills, the class time should be reduced to 15 minutes. Further consolidation of abilities and skills is carried out in conditions of emotional stimulation and emotionally intense critical situations. In particular, the teacher takes the future officers to the firing line, where he asks the cadets to enter a state of relaxed pre-situational readiness. The leader should conduct a briefing to explain that every loud shot will be responded to inside the body by involuntary muscle contractions, and this is normal. Such instruction is undertaken before the technique practiced by each cadet. Cadets must learn to relax quickly, without unnecessary movements, giving themselves a conditioned signal and producing a conditioned reflex. At the end of the briefing, the teacher notes that as soon as the cadets reach a state of mental calm, they should slowly approach the firing line and maintain relaxation in movement.

At this stage, the teacher focuses the cadets' attention on breathing and inspecting their body, the need to work out the conditioned signal, and requires them to slowly approach it after entering a state of relaxation, trying not to disturb it. After the cadets have completed the exercise, the teacher offers each of them to define a trigger, a trigger signal, for entering this state. The trigger can be of any form, that is, a bodily gesture, a feeling, a position, a squeeze, or anything associated with the desired state. It can be a sound, a verbal formula, a visual picture, a set of movements, etc. After each cadet has chosen a trig-

ger for himself, he is invited to independently practice entering the state and maintaining it against the background of powerful sound stimuli (shooting is taking place nearby). Then you need to check the acquisition of the shooting skill with a Makarov pistol, standing 25 m from the target.

The criteria of the skills' formation at this period are a clear attitude and positive motivation for the formation of psychological resistance to the use of firearms; persistent interest in self-development and self-improvement; the ability to arbitrarily relax muscles, reduce mental tension; the ability to arbitrarily induce a state of calmness, mobilization of forces; the ability to transition from a state of rest to combat readiness.

The second period is the main stage, which begins after the cadets have mastered the techniques of mental self-regulation. This stage involves consolidating the abilities and skills acquired in the first stage, improving the state of pre-situational readiness, optimal combat state, and transition from one state to another, working out the strategy of actions under the influence of psycho-traumatizing factors of service-combat activity.

At this period, the following tasks are solved:

- to teach cadets to reproduce the state of pre-situational readiness for emotionally tense conditions of using firearms;
- to improve the skill of arbitrary self-regulation of emotional states, ideomotor ideas about the future use of firearms in extreme situations;
- to work out the strategy of using firearms in the conditions of realization service and combat tasks.

This stage begins with the improvement of cadets' skills of voluntary self-regulation of emotional states, ideomotor ideas about the future use of firearms in combat conditions.

The development of reflection and the ability to exercise self-control allows you to purposefully study the pre-situational state of readiness for the influence of emotional factors. The pre-situational state of readiness allows officers to remain emotionally stable in suddenly arising emotional situations. This condition slows down the growth of tension in case of prolonged exposure to stress factors. The state of pre-situational readiness is induced by improving the techniques of self-suggestion, imagining the performance of the following actions that require determination from the cadet, that is, ideomotor training.

During ideomotor training, it is necessary to observe the basic rules of its implementation. First, the more accurately the movement image can be imagined, the more accurate the performed movement will be. Secondly, the imaginary image of the action must necessarily be connected with the muscle-joint sensations of the shooter, and the representations can be visual. In this case, the shooter sees himself as if from the outside. So, by observing a person's muscles during ideomotor training, you can easily find out how far his ideas about this or that technical element achieve the purpose. Thirdly, the effect of the influence representations increases markedly if they are combined with accurate verbal commands and pronunciations. Accordingly, it is necessary not only to imagine this or that movement but also to speak its essence out loud at the same time. In some cases, commands should be spoken simultaneously with the representation of the movement, and in other cases, commands should be spoken before the representation. Only practice will show which method to choose. The fact that words significantly enhance the effect of representation can be verified during the test with a finger on which an object hangs. If you not only imagine that the object starts to swing, let's say, forward, but start saying the word "forward" out loud, then the amplitude of the oscillations will immediately increase. Fourthly, to learn a new element of technique, it is necessary to imagine it at a slow tempo. A slow representation of the movement will allow you to imagine all the details of the studied gesture and warn of possible errors in time. Fifth, in order to learn a new technical element, it is necessary to imagine it in a position that is close to the spatial position of the body during its actual performance. So, when a person engages the ideomotor training and at the same time adopts a pose that is closest to the real one, more impulses from muscles and joints to the brain occur to detail the motor action. It is easier for the brain, which programs the correct ideomotor representation of movement, to coordinate execution with the musculoskeletal system. There is an opportunity to practice the necessary technical element more consciously. That is why simulators are useful. This type of exercise allows one to take a variety of poses, especially the movements that often take place outside after breaking away from the fulcrum. Having been in a state of imagined weightlessness, a person improves feeling the movement technique and imagines these details better. Sixth, the ideomotor movement reproduction sometimes is performed so vividly and expressively that the person involuntarily begins to move, which indicates the establishment of a strong connection between the two systems: programming and executing. Such a process is useful because the body is included in the execution of the movement which is born in consciousness. That is why, when ideomotor representations are not realized immediately, and

complications can be a part of the process, it is recommended to consciously join the ideomotor representations with the corresponding body gestures, and in this way, connect the imaginary image of the gesture with the muscles that perform it. In this way, a person can join the unsubstantial character of the movement with the muscles that perform it. Imitations are also important. The imitation of movement can form a more precise choice of a certain technical element, teaches to choose the necessary element to refer first to the sensations in the muscles, then to the impact of the brain. Therefore, the imitation of various movements, for example, during warm-up, is an effective help in preparing for the performance of this or that complex exercise. But, a mandatory condition for imitation is the realization of physical movements and their simultaneous imagination. If you think about something else during the simulation, it will not be useful. Seventh, it is wrong to believe that the final result comes immediately before the exercise, this is one of the common mistakes. If you focus only on the result, you can forget the way to achieve this result, that is, lose the main thing in the process. That is, if the shooter thinks that he needs to hit the target, this thought can prevent him from remembering those technical elements without which it is impossible to hit. That's why he doesn't hit. In such cases, they say "overdid" and forget to achieve the get purpose, they should think not about the final result but about the imaginary gestures of those actions that can help to realize it. So, the essence of the ideomotor training principle is the ability to imagine its ideomotor specificity before performing the body movement and accurately assess this movement.

After conducting ideomotor training, NGU's cadets must learn to change their state of consciousness. A teacher accents that the optimal state of consciousness is a state of relaxed expectation. At the preparatory stage, cadets had already worked out the state of relaxed expectation. At the main stage, it is necessary to acquire the skills of transition from a state of relaxed expectation (pre-situational readiness) to a combat (working) state.

The combat (working) state is an individual state of consciousness for each officer or cadet that corresponds to external conditions. This condition must meet certain general criteria.

1. To ensure maximum effective work of a cadet in circumstances of external factors.
2. To go into combat mode and perform actions without the use of any stimulating factors.
3. To stay in this psychological state should not harm a person's psyche and physiology.

According to the criteria, the condition should not be affective in nature, i.e. not have a strong emotional connotation. The cadet must have experience entering and exiting the combat readiness state at the stage of professional training. An instructor should instruct the cadets, and then practice the "combat state" exercise with the cadets. During this period, the training is performed 6-8 times. During the lesson, cadets' states may change several times in different situations. Then the teacher offers the group to test skills that have been formed, i.e. the body state of relaxed expectation and the optimal combat (working) state in practice, during the solution of the Special Combat Task. To achieve a positive result, cadets should do elements of tactical and technical, fire, and special physical training and must make maximum use of the acquired psychological skills.

The modeling of psycho-traumatic factors and the practice of action tactics in stressful situations have a unique role during this period. To reproduce the stress factors of the Special Combat Task in the practical work, teachers should use various methods of modeling the stress factors of extreme situations, such as a) visual, auditory, tactile; b) verbal-symbolic, visual, computer, training, simulation, and combat.

It is also important to use audio recordings with the sounds of people, gunshots, sirens, and the noise of the urban environment, which reproduce the actual conditions of the Special Combat Task for NGU officers. Simulations of real conditions of using firearms should be used in several periods. In the first stage, a positive motivational environment is created for the lesson. The authors outline that a motivational attitude is a tendency of cadets to act in a certain way, necessary for achieving the purpose of the lesson. It means the cadets' desire to learn, and their understanding of the purpose and content of the lesson. In addition, during the preparation, an instructive emotional background is created, which contributes to the emergence of mental tension during the lesson. Different techniques for creating a motivational attitude can be chosen depending on the psychological factors of training and combat activity that are planned to be modeled in the class.

In order to accurately and in detail simulate the danger factor for training, it is necessary to apply methodical techniques that create an appropriate emotional environment for the activity:

1. Before the training, it is necessary to cite cases of service and combat activity of NGU servicemen, when low psychological readiness to use weapons, was a reason for injury or death; it is necessary to cite examples of decisive and effective using weapons by officers to get the effective-

ness of the combat mission and as an indicator of high psychological readiness during practical activities.

2. Teachers can increase the cadets' interest in the next lesson in the framework of preparation, detailed instruction, increasing the control of the orders' execution that is related to the safety rules. The instruction before lessons should be significantly different from all other similar activities.

When cadets have grasped a motivational attitude, the main part is started, stress factors of the situation are simulated, and exercises with the use of weapons are performed.

The third period is the restoring stage and starts after the end of practical shooting by cadets in extreme conditions i.e. during the main period. By its content, this period is a complex of measures aimed at psychological rehabilitation and includes the following tasks: to restore physical and mental strength; to reduce or neutralize the negative stress effects that occurred in the process of firing firearms; to restore the mental state to contribute the optimal performance of military service tasks.

The authors point out that psychological recovery is the process of organized psychological influence aimed at normalizing the mental state of shooters to solve training, service, and combat tasks. Psychologically stabilizing work with cadets should begin with an objective assessment of each cadet's realization of training exercises with a Makarov pistol. To analyze the actions of the cadets, the teacher focuses on the right cadets' actions, analyzes mistakes, and points out ways to prevent them. The leader pays special attention to cadets' psychological readiness to use firearms and the formation of mutual transition skills from the state of waiting to the combat state.

To evaluate the actions of shooters, it is necessary taking into account the realization indicators of training shootings and the success of the results for each person, and also the influence of extreme factors on the emotional state of the actions. To study the mental state of cadets teacher uses observing and communicating with them, conducting individual and group psychological lessons, conversations, oral interviews, etc.

Such indicators as heart rate (table 2) and respiratory rate (table 3) were diagnosed during testing the effectiveness of the program. The diagnosis of these indicators was carried out in three stages (the first was before the start of the shooting, the second was during the shooting, and the third was 20 minutes after the shooting).

At the first stage, the average statistical indicators of heart rate in the three examined groups were respectively: the first group had 73.8 beats/min, the second had 71.5 beats/min, and the third had 72.2 beats/min, being in the range from 64 to 74.9 beats/min, which corresponds to a state of rest.

At this stage, the cadets experienced average amplitude of 10 beats/min of heart rate fluctuations. At the same time, it exceeded 71 bpm for 75% of cadets. Calculations showed that the value of variance for the first cadets' group is equal to 2.76, the second is 3.22, and the third is 5.49. The overall index of dispersion in the three groups of NGU cadets was 3.87 with an average statistical index of 72.8 bpm.

Table 2: Indicators of heart rate for groups of NGU cadets.

Group of students	**Heat rate (bpm)**		
	I period	**II period**	**III period**
The first group was highly skilled in the use of weapons	72.38	94.7	72.49
The second group was averagely skilled in the use of weapons	70.25	98.5	72.95
The third group was low-skilled in the use of weapons	71.82	101.3	73.26

Note: $p < 0.05$

At the second stage, the heart rate of all three cadets' groups significantly changed in the direction of increase. The average statistical indicator was 97 bpm. The heart rate in the studied individuals was equal to 91 and 107 bpm at the lower and upper limits. The third stage measurement revealed that the heart rate of almost all cadets stabilized and did not significantly differ from the initial background values. The average heart rate was 73.1 bpm. Accordingly, in the groups of cadets, he scored: for the first group was 71.9; for the second group was 73.15; for the third group was 73.62 bpm. The difference in group readings from the general is not significant. The total number of examinees, which is 2.22, confirms this.

The next indicator measured during the study was the respiratory rate (table 3).

Table 3: Respiratory rate indicators for groups of NGU cadets.

Group of students	**Respiratory rate (breaths per minute)**		
	I period	**II period**	**III period**
I group	14.3	23.4	14.8
II group	13.1	24.01	14.2
III group	13.1	27.9	14.0

Note: $p < 0.05$

At the first stage, the respiratory rate of all cadets

was within the normal range. The average statistical rate in all groups at this stage was 12.73 breaths per minute. For those examined at this stage, a slight deviation of personal values from the average statistical indicator is characteristic i.e. of 1.3 breaths per minute; low amplitude of breath frequency fluctuations ranging from 10 to 16 breaths per minute. The respiratory rate of cadets of all groups is not significantly different, as indicated by this.

At the second stage, the cadets' respiratory rate indicators changed, as a result of the firing conditions' influence. The average statistical indicator for all groups was 23.5 breaths per minute, which is 12 breaths per minute higher than the average value at the first stage. The variance according to the data of the three groups was 7.12, which confirms the increase in the spread of values by almost 7 units compared to the first stage.

At the third stage, the values of the respiratory rate indicator are characterized by a decrease in all cadets compared to the second stage. The statistical average of the respiratory rate for the three groups is 14.1 breaths per minute, which hardly exceeds this indicator at the first stage. The total variance is equal to 1.1. At this stage, there are no clearly expressed differences in the respiratory rate values of the cadets of all groups. So, in the first group, the respiratory rate is 13.5 breaths per minute, in the second is 14.2 breaths per minute, and in the third is 14 breaths per minute.

Intergroup differences were confirmed by mathematical calculations of the Student's t-test, which gives reason to assert that the data between groups are statistically reliable.

5 CONCLUSIONS

The principle scheme of forming the psychological readiness of future NGU cadets to use firearms should be carried out according to a certain algorithm and represent a sequence of periods, each of which is a step to achieve the purpose. At the same time, it is necessary to comply with the following requirements:

- to practice actions according to the principle of accessibility: from simple to complex;
- to practice situations using light and noise effects with recordings of people's cries for help to perform necessary actions and orders without the influence of the emotional and sensory sphere;
- to introduce non-standard elements into the training process based on studies of the using firearms by NGU cadets;
- to conduct psychological training during the fire training classes based on targeted influence on components of cadets' psychological readiness.

The impact of negative emotions on the mental state of NGU cadets is significantly reduced if a cadet knows which stress factors and difficulties he may face during military service tasks during service and combat tasks with firearm use. To improve psychological readiness, it is necessary to accumulate practical experience to overcome negative emotions that may arise during combat activities. The great value has the system of education and training classes, which is aimed at forming knowledge and skills that are necessary for making the optimal decision and improving the ability to manage one's condition in various situations. Noise habituation is one of the necessary elements in the organization of classes. Noise exposure causes anxiety and causes errors in behavior and actions.

Psychological support of service and combat activities should prevent the occurrence of such negative experiences as danger to life, concern for one's comrades, discomfort. It should include targeted psychological training; analysis of the behavior of NGU cadets during practical training of combat activity; assessment of the psychological fatigue degree; to form a motivation to continue a task realization in extreme conditions to service and combat activity.

The diagnostics results of the activity of the cadets' autonomic nervous system, which was carried out according to indicators such as heart rate and respiratory rate, gave grounds for conclusions. The measurement of cadets' heart rate at the first stage allows us to state that no significant differences were found between the groups. However, a significant increase in heart rate for all groups of examined cadets is observed in the second stage. It is caused by the increased influence of stress factors: excitement, the results of shooting, and the need to act in specific conditions. It was established that the cadets of the average and high level groups managed to mobilize their physical and mental strength to overcome mental tension at the time of the pistol exercise, their actions were confident and accurate. For cadets who are not successful in shooting under these circumstances, a higher heart rate is characteristic, which, as a rule, exceeds the indicator of 100 bpm. They were distinguished by an accelerated pulse, paleness of the face, which indirectly indicated great emotional stress. At the third stage, the heart rate indicators of the second and especially the third cadets' groups, who are more emotionally labile, exceed these indicators of the first group. According to the E. Gellhorn's theory, if people have increased emotional sensitivity and a high

level of motivation, they are able to detect the entire complex of vegetative changes in the body for a longer time (Gellhorn, 1964).

Breathing frequency measurements showed that cadets of all groups experienced rapid changes at the second stage. The first group is characterized by uniform controlled small breathing, which confirms the variance, which is equal to 1.89. The second group is characterized by more frequent breathing. Observations showed that the breaths of the second group representatives are deeper and more frequent in their periodicity than in the first group. The average statistical frequency of the second group breathing was 24.11 breaths per minute at the second stage. The average statistical frequency of the third group breathing turned out to be the highest of the three groups and amounted to 27.69 breaths per minute at the second stage. In this group, dispersion is also the largest and equal to 4.8. This indicates a large difference in respiratory rate readings among the cadets of this group.

After studying the heart rate and respiration data for all groups, the dependence between the level of cadets' psychological readiness and the indicators of vegetative changes was found: on average, 49.8% of all cadets are individuals who have accelerated breathing and heart rate during the period of exposure to shooting conditions. Also, 46.7% of cadets belong to averagely skilled or low-skilled groups in the shooting.

It was found that examinees, who have a high force of the nervous system, demonstrate a high level of successful actions while they use firearms, and examinees who have a weak force of the nervous system, demonstrate a low level of successful actions under the influence of shooting factors. The nervous system is exhausted when stress factors affect the human psyche. According to the results of our research, the force of the nervous system remains practically unchanged under the influence of shooting factors, even with their long-term influence on the human psyche.

Techniques and methods of psychological training for the NGU cadets allow them to maintain and strengthen the average force of a nervous system, but not to have a great influence on strengthening of a weak nervous system.

REFERENCES

Flood, A. and Keegan, R. J. (2022). Cognitive Resilience to Psychological Stress in Military Personnel. *Frontiers in Psychology*, 13:809003. https://doi.org/10.3389/fpsyg.2022.809003.

Gellhorn, E. (1964). Motion and Emotion: The Role of Proprioception in the Physiology and Pathologyof the Emotions. *Psychological Review*, 71(6):457–472. https://doi.org/10.1037/h0039834.

Jacobson, E. (1925). Progressive Relaxation. *The American Journal of Psychology*, 36(1):73–87. https://doi.org/10.2307/1413507.

Kolesnichenko, O. S., Matcegora, Y. V., Prikhodko, I. I., and Yurieva, N. V. (2016). Methods of determining the psychological readiness for military personnel at risk. *Honor and Law*, 4(59):77–89. http://chiz.nangu.edu.ua/article/view/137870.

Koltun, K. J., Bird, M. B., Forse, J. N., and Nindl, B. C. (2023). Physiological biomarker monitoring during arduous military training: Maintaining readiness and performance. *Journal of Science and Medicine in Sport*, 26(Supplement 1):S64–S70. https://doi.org/10.1016%2Fj.jsams.2022.12.005.

Kyrychenko, A. (2020). Features of psychological readiness of airborne assault servicemen troops of the Armed Forces of Ukraine during performance of tasks on purpose. *Bulletin of National Defense University of Ukraine*, 55(2):50–58. https://doi.org/10.33099/2617-6858-2020-55-2-50-58.

Lytvyn, A. V. and Rudenko, L. A. (2021). Formation of psychological readiness of cadets of SES higher schools to work in risky circumstances. *Bulletin of Alfred Nobel University. Series "Pedagogy and Psychology"*, (1 (21)):40–46. https://doi.org/10.32342%2F2522-4115-2021-1-21-5.

McCrory, P., Cobley, S., and Marchant, P. (2013). The Effect of Psychological Skills Training (PST) on Self-Regulation Behavior, Self-Efficacy, and Psychological Skill Use in Military Pilot-Trainees. *Military Psychology*, 25(2):136–147. https://doi.org/10.1037/h0094955.

Nassif, T. H., Adrian, A. L., Gutierrez, I. A., Dixon, A. C., Rogers, S. L., Jha, A. P., and Adler, A. B. (2021). Optimizing Performance and Mental Skills With Mindfulness-Based Attention Training: Two Field Studies With Operational Units. *Military Medicine*, 188(3-4):e761–e770. https://doi.org/10.1093/milmed/usab380.

Sekel, N. M., Beckner, M. E., Conkright, W. R., LaGoy, A. D., Proessl, F., Lovalekar, M., Martin, B. J., Jabloner, L. R., Beck, A. L., Eagle, S. R., Dretsch, M., Roma, P. G., Ferrarelli, F., Germain, A., Flanagan, S. D., Connaboy, C., Haufler, A. J., and Nindl, B. C. (2023). Military tactical adaptive decision making during simulated military operational stress is influenced by personality, resilience, aerobic fitness, and neurocognitive function. *Frontiers in Psychology*, 14:1102425. https://doi.org/10.3389/fpsyg.2023.1102425.

Taylor, M. K., Stanfill, K. E., Padilla, G. A., Markham, A. E., Ward, M. D., Koehler, M. M., Anglero, A., and Adams, B. D. (2011). Effect of Psychological Skills Training During Military Survival School: A Randomized, Controlled Field Study. *Military Medicine*, 176(12):1362–1368. https://doi.org/10.7205/MILMED-D-11-00149.

Precedent Phenomena of Culture: Translation and Linguo-Didactic Barriers and Ways of Overcoming Them

Olga Kanevska[a] and Kateryna Hostra[b],
Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine
o.b.kanevska@gmail.com, gostra@kdpu.edu.ua

Keywords: Precedent Phenomena of Culture as Linguo-Didactic Units, Precedent Phenomena of Culture as Translation Units, Translation of Precedent Phenomena of Culture.

Abstract: The paper defines and characterizes the translation and linguo-didactic barriers of learning and understanding of foreign language precedent phenomena of culture and ways to overcome them. It is determined that precedent phenomena of culture are important learning tool of teaching foreign language communication and subject of study for inophones. It has been established that working with precedent phenomena of culture is the important part of foreign language education and that the algorithmization of the translation process of precedent cultural phenomena will contribute to overcoming the difficulties of the translation.

1 INTRODUCTION

The anthropocentricity of modern science contributes to changing the vectors of research as a language (from the study of the language system to the analysis of human influence on language), linguo-didactics (the development of multilingual education in Ukraine as the basis for the formation of a modern person who can live and act in intercultural communication, international relations (social, political, economic, educational, etc.), activated by globalization world processes). The ideal of modern man and man of the future is an educated, culturally developed, multilingual personality, competent, tolerant, capable of learning throughout life, striving for self-improvement and constant development.

One of the issues of foreign-language linguo-didactics is the introduction of the socio-cultural component in the process of learning a foreign language. After all, any language is a system inextricably linked with a person as a representative of a certain linguistic and cultural community, a carrier of socio-historical and national-cultural experience.

The study of a foreign language involves the acquisition of competencies important for successful foreign-language speech activity (communicative, linguistic, speech, activity, socio-cultural, etc.). A sufficient level of the formed secondary linguistic personality of the student of a foreign language indicates that this person has cross-cultural (intercultural) competence, that is, he can realize himself within the dialogue of cultures.

Obstacles in the process of intercultural communication can be not only language and speech, but also cultural barriers: lack of mutual background knowledge or gaps in them, insufficient knowledge of the rules of speech etiquette, peculiarities of speech behavior, standards of culture, lexico-phraseological units with a national-cultural component of semantics, lack of the skills of their adequate use in situations of intercultural communication, etc. Lexico-phraseological units that significantly impede intercultural communication, there are precedent phenomena of culture, which reflect the specific features of a certain linguistic and cultural community, its national-cultural worldview is generalized.

Therefore, consideration of the precedent phenomena of culture from the point of view of the methodology of teaching a foreign language and translation will help to find effective ways to provide cross-cultural and translation competencies of those who study a foreign language.

In modern education, further development of the methodology of teaching a foreign language in general and translation training in particular (Alves and da Silva, 2021; Colina, 2003; Gerding-Salas, 2000; Korobeinikova et al., 2020; Malmkjaer, 2008; Miranda et al., 2021; Shupta, 2010; Vasylenko, 2015; Vitchenko, 2014) is becoming increasingly impor-

[a] https://orcid.org/0000-0003-1703-7929
[b] https://orcid.org/0000-0002-2266-492X

Kanevska, O. and Hostra, K.
Precedent Phenomena of Culture: Translation and Linguo-Didactic Barriers and Ways of Overcoming Them.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 41-49
ISBN: 978-989-758-579-1

tant. Thus, problems regarding the principles, content, structure of foreign language education, methods, techniques, technologies for forming the necessary competencies, ways to overcome intercultural barriers, etc. are actively investigated. The question of the specifics of the formation of the textual competence in translation from Ukrainian into English is solved by Kavytska and Kvasova (2017); formation of the English-language lexical competence of future philologists in the written translation of journalistic texts is engaged by Vasylenko (2015); translation competence – Malmkjaer (2008), Muratova (2017); development of translation skills of philology students – Vitchenko (2014).

Researchers and problems related to the mechanisms of studying foreign-language precedent phenomena of culture and methods of teaching them in foreign language classes did not remain without attention. The studies characterize the socio-cultural semantic load of precedent phenomena of culture, their didactic potential as units of teaching a foreign language, determine the specifics of working with them in native and foreign language lessons (Doroz, 2010; Fiedler, 2017; Lazarenko, 2014; Liontas, 2002; Miller, 2020; Rebrii and Tashchenko, 2015; Sprenger et al., 2006). Identification of the role of precedent phenomena in the formation of secondary linguistic personality during the study of a foreign language are devoted the works of Lazarenko (2014), Liontas (2002). V. Doroz considers precedent phenomena as the basic core of stereotypical knowledge of students of national communities (Doroz, 2010). In cultural and pragmatic aspects, phraseology and paremia are studied in the works of Miller (2020), Fiedler (2017). Rebrii and Tashchenko (2015) analyze precedent names in the translation aspect. Our studies (Hostra, 2021; Kanevska and Hostra, 2021) is devoted to highlighting the problems of precedent phenomena of culture as linguo-didactic units.

But the question of finding effective, efficient mechanisms for studying foreign-language precedent phenomena of culture that would help overcome intercultural barriers and simplify intercultural communication in any communication situation remains unresolved.

The goal of our research work is to define and characterize the translation and linguo-didactic barriers of learning and understanding of foreign language precedent phenomena of culture and ways to overcome them.

2 RESULTS AND DISCUSSION

From a linguo-didactic position, in our opinion, the precedent phenomena of culture are cognitive structures formed in the cognitive base of native speakers based on their socio-cultural and national cultural and historical experience.

Precedent phenomena of culture include: phraseology; paremia; names of culturally and historically significant events, objects; own names, references to well-known artistic and non-artistic texts (names, characters, themes, narratives, plots, artistic image, artistic image; popular, well-known persons, events, objects of reality, etc.); lexical units (realities) that are meaningful in the context of linguistic and cultural studies etc. All these varieties are combined into the category of "precedent phenomena of culture" on the basis of their linguistic and communicative essence, the presence of their national-cultural, socio-cultural or historical-cultural connotation.

Considering the pragmatic aspect of precedence as a category of text as a whole, let us pay attention to the connection of precedent phenomena of culture with a communicative act, the structural elements of which, as you know, are the speaker (subject of speech, addressee), the listener (object of speech, addressee), the transmitted information. The interaction of precedent phenomena of culture with the subject of speech is manifested in the following directions:

1) pragmatic meaning – instruction of the speaker (indirect meanings of statements, hints, non-statements, etc.);
2) depending on the intentions of the speaker, the assignment of linguistic units to the objects of reality, that is, the reference of the speaker;
3) the speaker's assessment of the general fund of knowledge (background knowledge), awareness, interests of the listener, that is, pragmatic presuppositions;
4) assessment of the content of the statement (truth/falsity, irony, expressiveness, ambiguity, etc.).

From the position of the object of speech, it is important to take into account such aspects as:

1) interpretation of speech, the ability of the listener to identify indirect or hidden meanings in the statement, to take into account the situation of communication, presupposition, the purpose of the speaker;
2) the impact of the statement on the addressee (expanding his awareness, changing his emotional state, assessment, impact on his actions, aesthetic effect, etc.).

Information contains a precedent phenomenon of culture, which can characterize all or part of a statement (communicative situation). If the addressee does not know the precedent unit used by the speaker, then communicative failure is inevitable.

Consequently, those phenomena of culture become precedent that native speakers use in communicative situations and that are understandable to most members of the linguistic and cultural society and deciphered by them.

Precedent phenomena of culture are inherent in linguo-didactic functions, which must be considered in the process of learning a foreign language and translation:

- nominative (naming and highlighting fragments of reality);
- persuasive (persuasion communicative partner);
- game (finding the way of expressing an opinion necessary for a certain communicative situation);
- password (determining the affiliation of a communicative partner to a particular social, cultural or national group);
- attraction (attracting the attention of the interlocutor – the recipient of the speech);
- image (the ability to get an impression of a person, the level of his culture, awareness, etc.);
- communicative (the precedent phenomenon of culture acts as a means of communication),
- allusive/or intertextual (a hint of a known fact, event, person, etc.);
- modeling (use of authentic precedent phenomena of culture without changes or adaptation, which makes it possible to present the communicative situation as a ready-made model that can be used for educational purposes);
- linguo-practical (methodological) (actualization of background knowledge directly in intercultural communication);
- socio-cultural (ability to update the necessary socio-cultural, historical-cultural or national-cultural information necessary for successful intercultural communication);
- diagnostic (determination of language proficiency; assigning the speaker to a certain level of language proficiency).

A generalized description of the precedent phenomena of culture as linguo-didactic units is shown in figure 1.

Thus, an important linguo-didactic feature of the precedent phenomena of culture is their dual essence: they are the object of study (they contain important national-cultural information) and a means of education (they are used as didactic material).

Translation of precedent phenomena of culture is an urgent issue of theory and practice of translation, the search for ways to create an adequate translation of these units is constantly ongoing, because their nature and features cause certain difficulties.

The scientific literature notes that "the task of the translator is to identify and analyze linguistic and extra-linguistic factors that help to achieve equivalence of translation. The ultimate goal of translation – the equivalent influence of texts on their recipients – becomes possible given the combination of factors of the communicative-speech situation, cultural aspects and, most importantly, the preservation of the communicative-pragmatic intention of the speaker of the original" (Kotliarova, 2011). Therefore, in our opinion, an important aspect of learning translation activity is the arming of future specialists with such a translation technique that would help them find the best ways to implement an adequate translation of the original text.

In the theory of translation studies, translation is understood as modeling and consistent transmission of the complex-structural content of the text. That is why, from our point of view, the process of learning translation can be carried out in four stages:

1) creating space for translation: searching for conceptual meaning based on the unity of old and new knowledge about the text;
2) compression of special knowledge, one of the forms of which is modeling;
3) interpretation of special meaning, that is, consistent interpretation of language units;
4) the definition of the theme and the rhyme of the text based on the actual division of the sentence.

Interpretation of language units in the translation aspect involves determining not only their lexical-semantic, grammatical, stylistic meaning, but also the national-cultural connotation known to native speakers of the original text and associated with the cultural codes of the national-cultural community, but unknown or insufficiently understood by native speakers of the translation language.

A generalized description of the precedent phenomena of culture as translation units is shown in figure 2.

Thus, the precedent phenomena of culture are "evident" texts, units of speech, formed in the cognitive base of native speakers and understandable to them, having a national-cultural, historical component, their

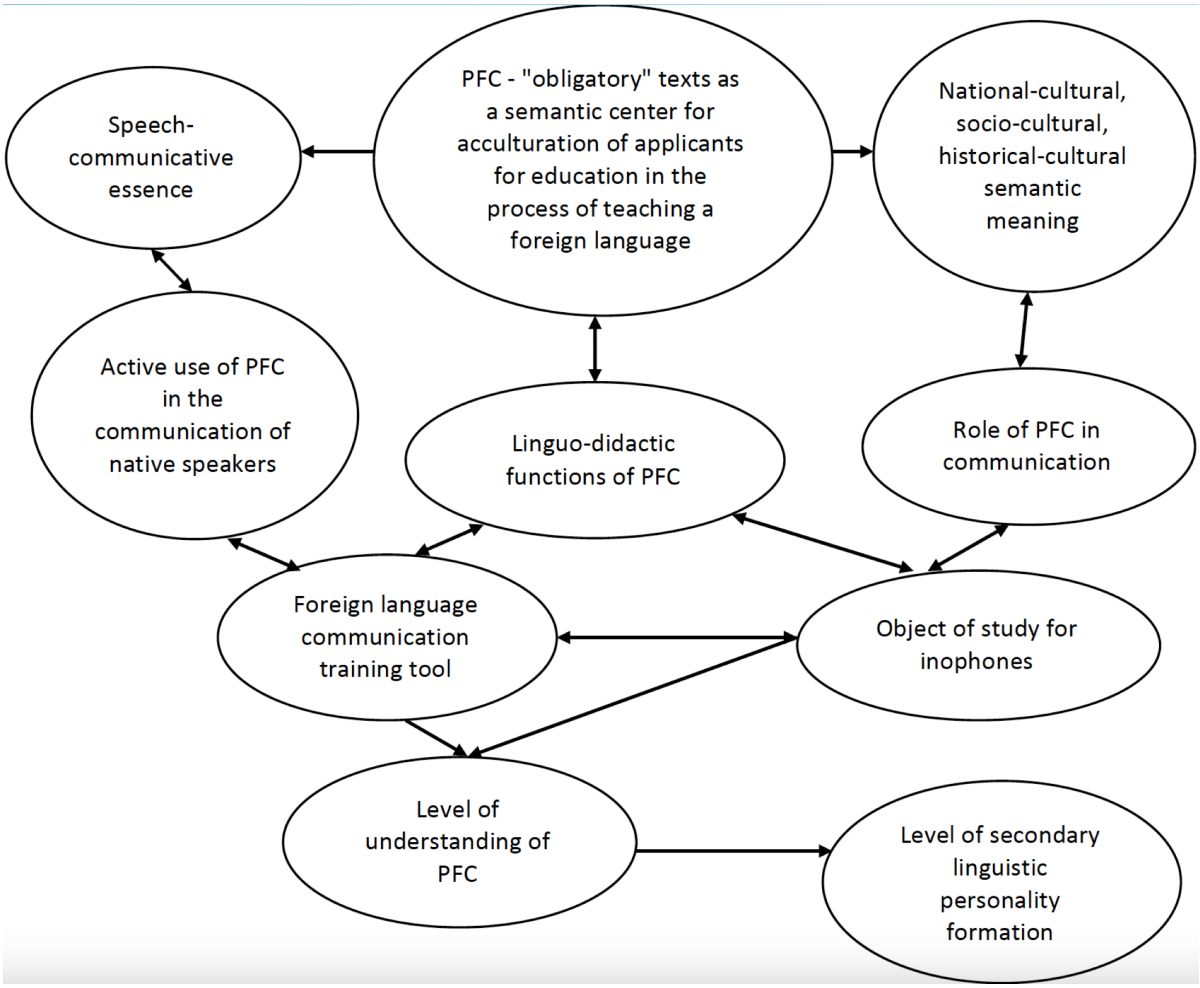


Figure 1: Precedent phenomena of culture as linguo-didactic units.

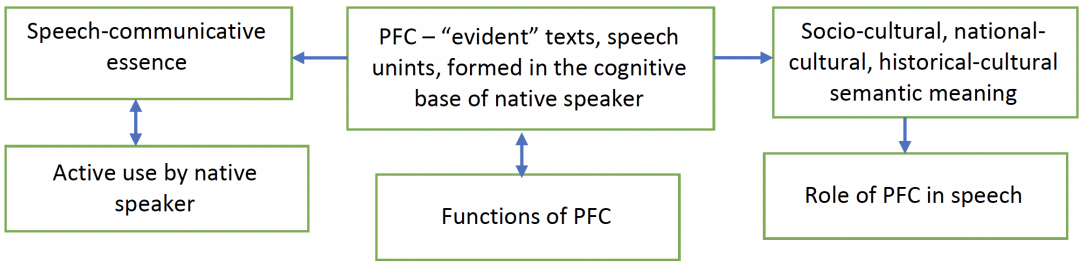


Figure 2: Precedent phenomena of culture as translation units.

use in speech depends on the situation of communication, the goal set by the subject of speech.

The use of precedent phenomena of culture in broadcasting, on the one hand, saves the communicative efforts of the speaker and the listener, marks speech, and on the other hand, can significantly complicate communication, primarily intercultural, and translation.

In the process of converting the text of the original into the text of the translation, it is necessary to be able to recognize, identify and select the equivalents of the precedent phenomena of culture, because they consist of valuable knowledge in cognitive and emotional plans for native speakers. For the professional activity of the translator, this is extremely important, because, in addition to the fact that the translator identifies and understands the language and cultural codes of one language, he must also translate these codes

into the plane of another language and culture.

The complexity of translating the precedent phenomena of culture is due to the fact that the translator must have two buildings of the precedent phenomena of culture at once: the original language and the target language. Provided that one of these buildings is not sufficiently formed, communicative failure may arise ("lack of youth or incomplete possession of communicative skills inherent in a certain national linguistic and cultural community" (Batsevych, 2007)) or even communicative or cultural shock as a result of a conflict between two cultures at the level of individual consciousness: inadequate interpretation, rejection, rejection a communicative phenomenon, a component of the culture of another linguistic and cultural community. Therefore, in intercultural communication, including translation, communicative failures are caused by the lack of age/insufficient level of possession of one of the communicants (or translator) by a system of meanings, national stereotypes, clichés of the culture in whose language communication takes place or from whose language translation is carried out.

Thus, not knowing the meaning of the English idiom bring down the house ("*викликати грім оваційб бурю оплесків*") can lead to a misunderstanding of such phrases as: The comedian brought down the house with his jokes about the lost dog; The clown sang a duet with the talking horse, which brought the house down every night, as well as to their inadequate, even comic, translation: *Гуморист розвалив будинок своїми жартами про загублену собаку; Клоун заспівав дуетом з балакучим конем, який щовечора руйнував будинок.*

In addition, there are cases when, as Zahorac (2021) notes, a precedent phenomenon can refer to another precedent unit or indicate their relationship. For example, a reference to a case text can be realized through other case phenomena – a case statement or a case name that is related to the text; case situations can be updated in the form of case statements or case names, etc. In such cases, the translation of the precedent phenomenon of culture is significantly complicated and requires a high level of cross-cultural competence from the translator.

For example, in F. S. Fitzgerald's novel "The Great Gatsby" we find the sentence: I graduated from New Haven in 1915 (Fitzgerald, 2014, p. 5); literal translation in Ukrainian: *Я закінчив Нью-Хейвен (Нью-Гейвен) у 1915 році*. Here we are talking about New Haven – one of the ancient cities of New England in the state of Connecticut (USA), which became famous thanks to Yale University, founded in 1701 and named after the British merchant, philanthropist Eli Yale, sponsor of the Encyclopedic school of the state of Connecticut, which was the predecessor of the Collegiate School (in 1718 – Yale College). The name of this city in the minds of Americans is a metonymic name of a famous educational institution. But in the translation of this novel by O. Kalashnikova we find: *Я закінчив Йельській університет в 1915 році* (I graduated from Yale University in 1915). The translator, based on her own knowledge about the connections of the university and its location, refused the metonymic transfer as a concise description of the object built on the relationship "part – whole". However, in our opinion, such a translation did not take into account the knowledge or ignorance of this fact by the receptor readers, so the communicative correspondence of the translated text to the original text was not fully ensured.

Difficulties of translation of precedent phenomena of culture are connected with the fact that precedent units should cause certain national-specific associations common to most members of a certain linguistic and cultural community among native speakers, so the translator needs to somehow transfer (reproduce) the image of associations into the text of the translation, preserve, not lose the author's intentions, cause similar reactions in the recipients of the text of the translation.

For example: The big news yesterday was President Obama's announcement of his steps to try and curb gun violence. I didn't see it. I don't want to bring the room down. My mind has been elsewhere. Literal translation in my Ukrainian: *Головна новина вчора: президент Обама оголосив про свої кроки, щоб спробувати приборкати насильство з використанням зброї. Я цього не бачив. Я не хочу розбивати (руйнувати, знищувати) кімнату. Мій розум був деінде.* But the idiom "Bring the room down" ("destroy the room") in this context means *"придушити всіх присутніх"* or *"знеохотити всіх у кімнаті"* ("make everybody here depressed" or "discourage everyone in the room"), so it is more appropriate to translate as: Я не вводжу всіх тут у депресію (that is, replace the idiom with a phrase that is close in terms of semantic load). The sentence My mind has been elsewhere (literally: *Мій розум був деінде / в якомусь іншому місці*) is a correct and useful phrase from the point of view of English writing. This phrase, which is usually used to describe a person who is not paying attention to the current situation or conversation, however, in this context is better translated as follows: *Мої думки були (блукали) десь в іншому місці / деінде.*

Thus, the translator must have solid background and cultural knowledge, be able to use them in the process of intercultural communication. When translat-

ing the precedent phenomena of culture, the translator uses not only knowledge of two languages (language competence), but also needs linguistic socio-cultural, intercultural competence, because knowledge of the stylistics, culture of speech, cultural and historical context of the original text and translation is necessary. The translation techniques used by the translator determine what the text of the translation will be, because the precedent phenomena of culture can make this text more or less emotional, expressive, accurate, may or may not cause the associations laid down by the author of the text, become a marker of the text.

The translator faces a number of difficulties that must be overcome in order to create an adequate translation, including: national-specific associations that are difficult to reproduce; discrepancies in the emotional-figurative component of the precedent phenomenon of the culture of the original language and the language of translation; contextual ambiguity.

So, in book *Harry Potter and the Cursed Child* we find the expression "It's almost laughable" (Rowling et al., 2016, p. 157), which was translated into Ukrainian using the phraseology *"Та це просто курям на сміх" (курям на сміх* – it's about something silly, something not worth paying attention to), that is, the translator used the technique of domestication.

Most often, translators try to find an equivalent of a precedent cultural phenomenon in the language of translation that is appropriate in terms of semantic, evaluative, and stylistic meaning. For example: "Ginny: You talk a lot of rubbish." / "Ginny: What nonsense are you talking about?". "To talk rubbish" – "to talk nonsense". The translator introduces the Ukrainian phraseology *"плести нісенітниці"*, only replaces *"нісенітниці"* with *"дурниці"*. Let's give another example: "He wasn't a black cloud" / *"І чорною хмарою. А він не був."* The English idiom "black cloud" means a person that ruins another persons' hopes and dreams, ideas or good moods by being pessimistic and having negative attitude"); in the Ukrainian language, the phraseology *"як чорна хмара"* is used to denote a depressed, gloomy person. That is why such an equivalent replacement is completely acceptable.

"And Ron and Hermione have gone completely skew whiff – and I still haven't figured out why." / *"А з Роном і Герміоною взагалі чортзна-що діється . . . і я ніяк не можу збагнути, чому."* The English idiom "skew whiff" has the meaning "sloping instead of straight, or wrongly positioned" (*характеризує все, що йде шкереберть*). In this case, the translator into Ukrainian used the expression *"чортзна-що"*, which is actually an equivalent.

In D. Carnegie's book *How to Win Friends and Influence People* there is such a phrase: "It's a byword in our profession that no one enjoys wielding the ax" (Carnegie, 1981, p. 165) *(Досл.: У нашій професії прийнято говорити, що нікому не подобається орудувати сокирою*). So, in English, the idiom "wielding the ax" means "wielding an ax", "a person who decides someone's fate". In the Ukrainian translation: *"Нікому не подобається роль «ката»"*. It is relative monoequivalent with differences in grammatical characteristics and other lexical composition, but the negative assessment of the precedent cultural phenomenon was preserved.

Thus, the difficulty of translating the precedent phenomena of culture is caused by their peculiarities – imagery, national-cultural connotation, ethnic specificity.

Overcoming the difficulties of translating the precedent phenomena of culture will be facilitated by the algorithmic actions of the translator:

- the first stage is the separation of the precedent phenomenon of culture from the general stream of speech;
- the second stage – linguo-cultural and translation analyses of the precedent phenomenon of culture;
- the third stage is the analysis of the speech function of the precedent phenomenon of culture in the original language;
- the fourth stage – directly the selection of the equivalent;
- the fifth stage is the translation analysis to identify errors and avoid them in the future.

Briefly characterize how the proposed algorithm works in translation practice.

The ancient Chinese were a wise lot – wise in the ways of the world; and they had a proverb that you and I ought to cut out and paste inside our hats. It goes like this: "A man without a smiling face must not open a shop." (Carnegie, 1981, p. 70).

In this context, there are such precedent cultural phenomena as: the English idiom "the ways of the world" and the Chinese proverb "A man without a smiling face must not open a shop", translated into English.

The author used the idiom "the ways of the world", which literally means *"прийняті типи та способи поведінки"*, in the Ukrainian text the translator rendered this expression *"це всім відомо"*, he used a contextual translation and replaced this idiom.

In the Ukrainian translation, a smiling face was conveyed using the subjunctive part of the sentence: *"Людина, яка не вміє посміхатися"*, that is, a rela-

tive monoequivalent with partially distinct grammatical differences was selected.

Therefore, the following translation of a passage from D. Carnegie's book was proposed: *"Стародавні китайці були дуже мудрі, це всім відомо. Одне з їхніх прислів'їв варто записати і пришити до підкладки капелюха. Китайці говорили: «Людина, яка не вміє посміхатися, не повинна відкривати власний магазин»"*.

Let's give another example from D. Carnegie's book: Remember the old proverb: "By fighting you never get enough, but by yielding you get more than you expected." (Carnegie, 1981, p. 115) – in Ukrainian: Remember the old proverb: *"Пам'ятайте старе прислів'я: «Борючись, ви ніколи не отримуєте достатньо, але, поступаючись, ви отримуєте більше, ніж очікували»"*. In the Ukrainian translation of the book we find: Згадайте старе прислів'я: *"Силою багато не візьмеш, а поступившись, отримаєш більше, ніж сподівався"*. The translator has chosen such an equivalent, in which only the structure has been changed compared to the English text, and also removed the word never, this is dictated by the structure of the proverb in the translated language, as it functions precisely in this composition.

In sentences: My friend has a bee in her bonnet about immigrating to Canada (Native English, 2023); Bee in your bonnet, Harry Potter? (Rowling, 2000, p. 517) – we find the idiom "Bee in your bonnet", which literally translates as *"Бджола в твоєму капелюсі"*, it means *"нав'язлива ідея"*; "To have a bee in one's bonnet" (*"мати бджолу в капелюсі"*) – *"носитися з ідеєю, бути схибленим на чому-небудь."* Translators most often use free translation – replacing an idiomatic expression with an expression without images, which leads to a loss of imagery, evaluation, expressiveness (*"зациклитися на чомусь"): У моєї подруги є сумніви щодо імміграції до Канади; Щось тебе мучить, Гаррі Поттере?* (compare: *Бджола в твоєму капелюсі, Гаррі Поттере?*).

In our opinion, step-by-step work will help overcome difficulties that may cause communicative failure or poor translation.

In the process of learning a foreign language and translation, from our point of view, it is necessary to form the ability of applicants for education to translate the precedent phenomena of culture in any situation of intercultural communication.

3 CONCLUSION

Precedent phenomena of culture are certain reproducible units of speech, which are formed in the process of interaction of a native speaker with representatives of his linguistic and cultural community, therefore they have a national-cultural, sociohistorical component, their inclusion in the communication process depends on the goal set by the subject of speech.

Using of precedent cultural phenomena in the speech of native speakers makes them an important means of teaching foreign language communication and a subject of study for inophones: it is impossible to form a secondary linguistic personality, which is the main goal of foreign language education, without taking into account the role of precedent phenomena of culture in speech (creation of subtext, hint, the presence of intertextual connections, assessment of utterances, assessment of the situation, the way of expressing the intents of the speaker, etc.).

Precedent phenomena of culture are used to facilitate communication, labeling of text/discourse, saving communicative efforts, but can greatly complicate communication, make situations of unsuccessful interlanguage and intercultural communication possible.

In practical activities, it is necessary to take into account certain aspects of the translation of foreign cultural precedent phenomena that significantly affect the choice of translation transformations used by the translator to reproduce them in the translation text, such as:

1) take into account the style and type of the text, its genre affiliation, the communicative intentions of the author. It is not always appropriate to use such a translation transformation as replacement, because precedent cultural phenomena reflect national, historical and cultural information, and their replacement can provoke the loss of the national and cultural character of the text, at the same time, the use of tracing and transcriptions can lead to obscuring the content of the text and lead to its misunderstanding by the addressees of intercultural communication;
2) determine the place and function of the precedent phenomenon of culture in the text. There are cases when it is appropriate to remove a precedent cultural phenomenon, if it does not affect the general understanding of the message;
3) take into account the nature of the precedent phenomenon of culture in accordance with the degree of its familiarity / obscurity, usage, cultural, literary and linguistic tradition of its use in speech;

4) take into account the grammatical and word-forming features of the foreign-language precedent cultural phenomenon in the translation language, taking into account the culture of speech, the tradition of use, the socio-cultural context, etc. In this aspect, it is necessary to pay attention to the precedent phenomena of culture, which are known to a large number of representatives of the modern population of all countries, that is, universal precedent phenomena, which almost always have their own version in different cultures, but for their correct inclusion in the text, the translator must use grammatical and lexical transformation

It has been determined that, firstly, in the process of learning a foreign language and translation, it is necessary to work purposefully on the assimilation by applicants for education of the precedent phenomena of the culture of the learned language, namely: to determine the semantic significance of the precedent units, to explain their national-cultural and cultural-historical significance, to evaluate their expressive possibilities. The purpose of such work is forming the ability of applicants for education to decode the information received in the form of a precedent phenomenon of culture, the ability to skillfully and appropriately introduce the precedent phenomena of culture into their own speech. Secondly, the algorithmization of the process of translation precedent cultural phenomena will contribute to solving difficulties during their translation.

It is possible to overcome intercultural barriers in the process of translation of precedent cultural phenomena, if, even at the stage of learning a foreign language, one takes into account their specificity and frequency of use in the speech of native speakers of the studied language, that is, purposefully form sociocultural, cross-cultural, translation competence in students, expand their background knowledge.

Further research requires the methodology of forming the translation competence of the students through the translation of various types of precedent cultural phenomena, which are part of the conceptual apparatus of the language (native and foreign), literature, art and history.

REFERENCES

Alves, F. and da Silva, I. A. L. (2021). Bridging Paradigms to Approach Expertise in Cognitive Translation Studies. In Muñoz Martín, R., Sun, S., and Li, D., editors, *Advances in Cognitive Translation Studies*, pages 89–108. Springer Singapore, Singapore. https://doi.org/10.1007/978-981-16-2070-6_5.

Batsevych, F. (2007). *Slovnyk terminiv mizhkulturnoi komunikatsii [Dictionary of intercultural commubication terms]*. Dovira, Ukraine, Kyiv. https://http://irbis-nbuv.gov.ua/ulib/item/UKR0004883.

Carnegie, D. (1981). *How To Win Friends And Influence People*. https://ia801004.us.archive.org/1/items/HowToWinFriendsAndInfluencePeopleBy/How%20to%20Win%20Friends%20and%20Influence%20People%20by.pdf.

Colina, S. (2003). *Translation Teaching: from Research to the Classroom*. McGraw Hill, New York.

Doroz, V. (2010). Pretsedentni fenomeny – bazove yadro stereotypnykh znan uchniv natsionalnykh spilnot [Precedent phenomena are the basic core of stereotypical knowledge of students of national communities]. *Ukrainska mova i literatura v shkoli*, 1:6–11. https://tinyurl.com/3dc3snjj.

Fiedler, S. (2017). Phraseological borrowing from English into German: Cultural and pragmatic implications. *Journal of Pragmatics*, 113:89–102. https://doi.org/10.1016/j.pragma.2017.03.002.

Fitzgerald, F. S. (2014). *The Great Gatsby*. https://www.wsfcs.k12.nc.us/cms/lib/NC01001395/Centricity/Domain/7935/Gatsby_PDF_FullText.pdf.

Gerding-Salas, C. (2000). Teaching Translation: Problems and Solutions. *Translation Journal*, 4(3). https://translationjournal.net/journal/13educ.htm.

Hostra, K. V. (2021). *Methods of working with precedent cultural phenomena while teaching the Russian language in basic school*. The dissertation submitted for scientific degree of Doctor of Philosophy (Ph. D.) on specialty 014 Secondary education (Foreign languages), Kryvyi Rih State Pedagogical University, Kryvyi Rih. http://elibrary.kdpu.edu.ua/xmlui/handle/123456789/7495.

Kanevska, O. B. and Hostra, K. V. (2021). Lingvodidakticheskiye aspekty vydeleniya kriteriyev ponimaniya pretsedentnykh fenomenov kultury vtorichnoy yazykovoy lichnostyu [Linguodidactic aspects of separation of understanding the precedent phenomena of culture by a secondary linguistic personality]. *Science and Education a New Dimension*, 98:18–21. https://doi.org/10.31174/SEND-PP2021-247IX98-04.

Kavytska, T. and Kvasova, O. (2017). Assessing Textual Competence in Translation into a Second Language. In Hidri, S., editor, *Revisiting the Assessment of Second Language Abilities: From Theory to Practice*, pages 197–215. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-62884-4_10.

Korobeinikova, T. I., Volkova, N. P., Kozhushko, S. P., Holub, D. O., Zinukova, N. V., Kozhushkina, T. L., and Vakarchuk, S. B. (2020). Google cloud services as a way to enhance learning and teaching at university. *CTE Workshop Proceedings*, 7:106–118. https://doi.org/10.55056/cte.315.

Kotliarova, I. (2011). Osoblyvosti metodyky vykladannia usnoho poslidovnoho perekladu u vyshchykh navchalnykh zakladakh [Peculiarities of the method of teaching consecutive oral translation in higher educational institutions]. In *Materialy Mizhnarodnoi*

naukovo-praktychnoi konferentsii "Fakhovyi ta khudozhnii pereklad teoriia, metodolohiia, praktyka". Kyiv Ahrar Media Hrup. https://er.nau.edu.ua/handle/NAU/47299.

Lazarenko, S. (2014). Pretsedenti fenomeny v suchasnomu ukrainskomu hazetnomu dyskursi ta yikhnia rol u formuvanni vtorynnoi movnoi osobystosti pid chas vykladannia ukrainskoi movy yak inozemnoi [Precedent phenomena in modern Ukrainian newspaper discourse and their role in the formation of secondary language personality during teaching Ukrainian as a foreign language]. *Teoretychna i dydaktychna filolohiia*, 18:78–82. http://nbuv.gov.ua/UJRN/Tidf_2014_18_17.

Liontas, J. I. (2002). Exploring second language learners' notions of idiomaticity. *System*, 30(3):289–313. https://doi.org/10.1016/S0346-251X(02)00016-7.

Malmkjaer, K. (2008). Translation competence and the aesthetic attitude. In Pym, A., Shlesinger, M., and Simeoni, D., editors, *Beyond descriptive Translation Studies: Investigations in Homage to Gideon Toury*, volume 75 of *Benjamins Translation Library*, pages 293–310. John Benjamins Publishing Company. https://doi.org/10.1075/btl.75.23mal.

Miller, J. (2020). The bottom line: Are idioms used in English academic speech and writing? *Journal of English for Academic Purposes*, 43:100810. https://doi.org/10.1016/j.jeap.2019.100810.

Miranda, C. C. L. A., Gonçalves, J. L. V. R., and Rodrigues, C. H. (2021). Uma Reflexão Inicial sobre o Processo de Tradução/Revisão de um Texto Produzido por uma pessoa Surda em Português Escrito. *Cadernos de Tradução*, 41(esp. 2):303–333. https://doi.org/10.5007%2F2175-7968.2021.e84521.

Muratova, V. F. (2017). Formuvannia perekladatskoi kompetentsii u suchasnomu hlobalizovanomu suspilstvi [Forming Translator's Competence in The Modern Globalized Society]. *Science and Education a New Dimension. Philology*, 145:33–35. https://doi.org/10.31174/SEND-PH2017-145V41-07.

Native English (2023). have a bee in one's bonnet. https://www.native-english.ru/idioms/have-a-bee-in-ones-bonnet.

Rebrii, O. V. and Tashchenko, G. V. (2015). Precedentni imena yak problema literaturnoho perekladu [Precedent Names as a Problem of Literary Translation]. *The Journal of V.N. Karazin Kharkiv National University. Series: Foreign Philology. Methods of Foreign Language Teaching*, 81:272–280. https://periodicals.karazin.ua/foreignphilology/article/view/5370.

Rowling, J. K. (2000). *Harry Potter and the Chamber of Secrets*. https://kalyankrishna4886.files.wordpress.com/2013/09/harry-potter-book-collection-1-4.pdf.

Rowling, J. K., Thorne, J., and Tiffany, J. (2016). *Harry Potter and the Cursed Child Parts One and Two*. Pottermore Limited. https://kvdrdolibrary.files.wordpress.com/2021/08/harry_potter_and_the_cursed_child.pdf.

Shupta, O. V. (2010). Pereklad yak metod navchannia movy spetsialnosti. *Visnyk Natsionalnoi akademii Derzhavnoi prykordonnoi sluzhby Ukrainy*, (4). http://nbuv.gov.ua/UJRN/Vnadps_2010_4_19.

Sprenger, S. A., Levelt, W. J. M., and Kempen, G. (2006). Lexical access during the production of idiomatic phrases. *Journal of Memory and Language*, 54(2):161–184. https://doi.org/10.1016/j.jml.2005.11.001.

Vasylenko, T. P. (2015). *Forming of the English Lexical Competence in Translation of Future Philologists on the Basis of Translation of Op-ed articles*. Thesis for a Candidate Degree in Pedagogical Studies. Speciality 13.00.02 – Theory and Methodology: Germanic Languages, Kyiv National Linguistic University, Kyiv. https://nrat.ukrintei.ua/searchdoc/0415U005518.

Vitchenko, A. Y. (2014). Metodyka vykorystannia oryhinalnykh khudozhnikh tekstiv u protsesi formuvannia perekladatskykh umin studentiv-filolohiv [The methodology of using the original fiction texts in the process of forming the translators' abilities among the students-philologists]. *Zhytomyr Ivan Franko State University Journal*, 75:57–61. https://eprints.zu.edu.ua/13627/1/57-61.pdf.

Zahorac, A. (2021). The problem of precedentness in contemporary Slovak literature and its translation (as reflected in Hvorecky's novel Tahiti). *BRIDGE: Trends and Traditions in Translation and Interpreting Studies*, 2(1):68–79. https://www.bridge.ff.ukf.sk/index.php/bridge/article/view/40.

Applying the Content-Based Instruction Approach to Vocabulary Acquisition for Students of English for Specific Purposes

Larysa V. Mosiyevych[1][a], Olena M. Mikhailutsa[1][b], Karina V. Belokon[1][c], Andriy V. Pozhuyev[1][d], Tetiana V. Kurbatova[2][e]

[1]*Zaporizhzhia National University, 66 Zhukovskoho Str., Zaporizhzhia, 69600, Ukraine*

[2]*Kryvyi Rih National University, 27 Vitalii Matusevych Str., Kryvyi Rih, 50027, Ukraine*

larisamosiyevich1977@gmail.com, elenamikhaylutsa7@gmail.com, kurbatova@knu.edu.ua

Keywords: Content-Based Instruction, Grammar-Translation Method, Mechanical Engineering, Semantization, Translation, Vocabulary Acquisition.

Abstract: The article aims to analyze the efficiency of applying the CBI (content-based instruction) approach to vocabulary acquisition for Mechanical Engineering students in ESP (English for Specific Purposes) classes. Analysis of Ukrainian coursebooks in ESP for Mechanical Engineering students shows that vocabulary acquisition is provided via Grammar-Translation Method (GTM). The pedagogical experiment is carried out to compare the vocabulary acquisition results based on the CBI and GTM. Group 1 and Group 2 are presented with new terminology via the above-mentioned methods. They also do different activities for mastering new terms. At the final stage, students do vocabulary assessment tests and questionnaire. Based on the results obtained, students' errors are studied. Wilcoxon-Mann-Whitney's test proves the hypothesis stated. In conclusion benefits and drawbacks of the CBI and the GTM are given. The authors develop recommendations for implementing CBI principles in vocabulary acquisition in ESP classes. The paper is intended for a wide range of specialists interested in teaching ESP and students.

1 INTRODUCTION

Presenting new terminology is an indispensable stage in ESP. It is assumed that students will learn a foreign language faster, better, and feel more confident in using it in the workplace if they effectively master subject-specific/profession-related terms (Cauli, 2021). Since terms are the basis of professional communication, neither reading nor speaking on professional topics is possible without mastering them (Bakirova, 2020). Learning technical terms in isolation is difficult for students, thus teachers should develop strategies to deal with the vocabulary they encounter (Quero and Coxhead, 2018).

Many ESP researchers prove that vocabulary teaching and learning is one of the most important aspects of ESP alongside the development of four basic skills. It is the underlying component on which other skills can be developed (Khazaal, 2019), "... foundation upon which to build the overall language proficiency" (Costeleanu, 2019). Vocabulary acquisition is essential in ESP because it helps learners understand the language and ideas of their field of activity (Quero and Coxhead, 2018).

Although there are some methodological papers deal with designing an ESP course for Mechanical Engineering students (Elizondo González et al., 2020; Izidi and Zitouni, 2017), there are no specific papers about teaching terminology for Mechanical Engineering students of ESP. That is why the problem of presenting new terminology for Mechanical Engineering students in ESP lessons is quite relevant.

As noted by Chirobocea (2018) and Marinov (2016), translation as a teaching method has been associated with the grammar-translation method for a very long time and, consequently, its use in teaching a foreign language is often criticized (Mart, 2013). Benati (2018) also defines the grammar-translation method as a traditional one which "...involves very little spoken communication and listening comprehension". The drawbacks of the grammar-translation method are as follows:

[a] https://orcid.org/0000-0003-3576-9736
[b] https://orcid.org/0000-0003-2935-7997
[c] https://orcid.org/0000-0003-2000-4052
[d] https://orcid.org/0000-0002-4083-5139
[e] https://orcid.org/0000-0002-0991-2343

Mosiyevych, L., Mikhailutsa, O., Belokon, K., Pozhuyev, A. and Kurbatova, T.
Applying the Content-Based Instruction Approach to Vocabulary Acquisition for Students of English for Specific Purposes.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 50-60
ISBN: 978-989-758-579-1

1) the result of this approach is usually a student's inability to use language for communication;
2) it does not focus on the context so the communication skills of learners remain poor.

The problem of teaching ESP for Mechanical Engineering students also deals with a lack of relevant coursebooks. The scope of Ukrainian coursebooks in ESP for Mechanical Engineering students shows that they are based on the principles of the GTM.The new words are introduced through English-Ukrainian translation.The set of vocabulary activities is also based on translation. Here is a comparative analysis of Ukrainian coursebooks in the context of our research objective (table 1).

Table 1: Comparative analysis of Ukrainian coursebooks in ESP for Mechanical Engineering students.

Vocabulary learning stages	The textbook by Ivanov et al. (2013)	The textbook by Shestopal and Slobodyanyuk (2017)
Presenting a new vocabulary	Translation	Translation
Practicing exercises	Including English-Ukrainian and Ukrainian-English translation exercises	Including Ukrainian-English translation exercises
Assessment Test	None	Multiple-choice test in English

Thus, available Ukrainian coursebooks in ESP for Mechanical Engineering students are mainly based on the grammar-translation method.

The English textbook "Career Paths: Mechanics" (Dearholt, 2015) is rated according to the Common European Framework of Reference for Languages at A1 (Book 1), A2 (Book 2), and B1 (Book 3) levels. They are inappropriate for third-year Bachelor students.

The e-coursebook "English for Mechanics" by May (2005) lacks language and content activities, except for providing answers to questions. Open Educational Resources (OER) do not have any English for Mechanics coursebooks available. Thus, the review of resources revealed that among available ESP coursebooks for 3rd-year mechanical engineering students, there are either materials of inappropriate English level (among authentic coursebooks) or coursebooks based on the GTM (in the Ukrainian ESP domain).

As an alternative, the CBI use in vocabulary acquisition in ESP classes is proposed in the study. CBI is an approach to language teaching in which content, texts, activities, and tasks drawn from subject-matter topics are used to provide learners with authentic language input and engage learners in authentic language use (Brown and Bradford, 2017).

Content-based instruction is considered as one of the effective instructional methodologies because it uses English as a medium to teach content knowledge while generating multiple opportunities for students to use English in class (Vanichvasin, 2019).

The development of vocabulary plays a crucial role for students of content-based instruction, as vocabulary development directly impacts their academic achievements by meeting both content and language learning objectives. CBI students need to master general English vocabulary for communication, as well as terms that are specific to their areas (Echevarría et al., 2010).

ESP vocabulary instruction is analyzed through comparison of CBI vs. GTM for Iranian Management students. The results indicated a significant propriety of CBI over the GTM in improving vocabulary acquisition of the ESP students (Ahmadi-Azad and Kuhi, 2016).

The problem of searching for the best methods is relevant in the Ukrainian educational environment. Although CBI is not so popular in Ukraine, it is quite relevant for ESP classes. According to the British Council review conducted in Ukraine, ESP and EMI are considered dominant approaches in English teaching at Ukrainian non-philological Universities (Bolitho and West, 2017). In the latest research, CLIL is added to ESP and EMI as the three principal approaches in tertiary education in Ukraine (Zarichna et al., 2020). CLIL implementation in the Ukrainian educational system has become a subject of the latest research by Leshchenko et al. (2018). The CBI approach has not received sufficient attention in ESP teaching at Ukrainian technical universities, and its effectiveness needs to be examined.

The article *aims* to compare the application of the CBI and the GTM for vocabulary acquisition for Mechanical Engineering students in ESP classes.

The research aim entails solving the following *tasks*:

1) examining the CBI principles;
2) designing vocabulary activities based on the GTM and the CBI principles;
3) comparing the results of mastering new terminology through the CBI and the GTM;
4) surveying the students from both groups regarding to assess the methods applied at a lesson;
5) identifying benefits and drawbacks of the CBI and the GTM in ESP classes;

6) developing recommendations for implementing CBI principles in vocabulary acquisition in ESP classes.

Hypothesis: based on the above-mentioned tasks, we expect that vocabulary acquisition through the CBI approach will outperform the grammar-translation method.

2 METHODS

A total of 40 third year bachelor's degree students of Mechanical Engineering specialty of the Engineering Institute of Science and Education, Zaporizhzhia National University are engaged in the pedagogical experiment. They were randomly divided into two groups, with 20 students in each group: 18 males and 2 females. The participants' age range was from 19 to 21. All of them speak Ukrainian as their mother tongue and learn English as a foreign language.

The grouping was not determined by their overall proficiency in English since the students had a similar level, as indicated by a Comprehensive English Language Test conducted prior to the distribution. In Group 1 new terms are introduced and mastered through the CBI, in Group 2 – through the GTM. The comparison results of successful memorization of new terminology are based on the test conducted at the next lesson. Besides, the students from both groups are surveyed regarding the applied method. Thus, research results are based on quantitative data from test results and qualitative data collected from students' questionnaires.

The research is carried out in three stages. At the first stage, a mechanical engineering-related text with new terms is selected. New terms are introduced to twenty students in Group 1 via visual aids and via the translation method in Group 2 before reading the same text. After that, the students in both groups read the text and do the vocabulary activities which are different in both groups.

At the second stage, the vocabulary assessment test enables to compare the results of vocabulary acquisition in both groups. Wilcoxon-Mann-Whitney's test is applied for proving the hypothesis stated. The additional data required are collected from questionnaires to get the students‘ responses to the CBI/the GTM in vocabulary acquisition.

At the third stage, the item difficulty of test results is calculated in each group, and compared.

To sum up, the experimental data are obtained from the results of vocabulary assessment test, and students' questionnaires.

3 RESULTS

The results are based on qualitative and quantitative data collection. Qualitative data are collected from the students' questionnaires. Information about their attitude toward a method applied at the lesson is collected. Four evaluation criteria are included: vocabulary presentation, meaningful activities, cognitive load, engagement/interest.

Comparison of the effectiveness of specified teaching methods in the two groups for a significance level of 5% for each criterion is conducted using the Mann-Whitney U-test. Hypotheses are formulated for each evaluation criterion: H_0 – the results in the two groups do not differ significantly, and H_1 – the results in the two groups differ significantly. The calculated data are presented in table 2.

Table 2: Students' questionnaires about the GTM and the CBI approaches.

Evaluation criteria	CBI average score	GTM average score	U_{emp}
1. Vocabulary presentation (scale 1-5)	4.5	3.75	75
2. Meaningful activities (scale 1-5)	4.5	4.25	156.5
3. Cognitive load (high / medium / low)	medium	high	
4. Engagement/ interest (scale 1-5)	5	3.75	15

For the given level of significance $\alpha = 0.05$, and sample sizes $n_1 = 20, n_2 = 20$, we find the critical value as $U_{crit} = 127$ from the table. The comparison of the obtained empirical values for each evaluation criterion with the critical value enables the following conclusion: the majority of students from Group 1 have more positive attitude toward using visual aids and contextualization. The students from Group 2 have negative attitude toward vocabulary presentation through translation and out of context. The results in Criterion 2 are quite similar: the students from both groups find the vocabulary activities meaningful. The majority of students in Group 2 indicate high cognitive load in the GTM, while Group 1 indicates its medium level. While all the students in Group 1 find the CBI approach engaging and interesting based on the final criterion, in Group 2, students have expressed an opposite opinion toward the GTM. The results enable to conclude that students in Group 1 have a more positive attitude toward the CBI, while students in Group 2 exhibit a less positive attitude toward the GTM.

Quantitative data are based on the results of the same multiple-choice test for both groups. The total number of questions is 30. They are supposed to be distributed among the first three levels of Bloom's taxonomy: remembering (items 1-10), understanding (items 11-20), and applying (items 21-30).

The number of mistakes made in the test at each cognitive level enables calculating an item difficulty. We calculated it for both groups, as shown in table 3 and table 4.

The formula used to calculate the item difficulty is presented in formula (Maharani and Putro, 2020):

$$item_{difficulty} = \frac{N_{correct}}{N_{tested}} \quad (1)$$

where: $N_{correct}$ – the number of students who answered correctly; N_{tested} – the number of students who are tested.

Table 3: Item difficulty in Group 1.

Cognitive level	Number of items in a test	Number of students who answered a question correctly	Number of students in Group 1	The difficulty index
Remembering	10	15	20	0.75
Understanding	10	15		0.75
Applying	10	13		0.65

Table 4: Item difficulty in Group 2.

Cognitive level	Number of items in a test	Number of students who answered a question correctly	Number of students in Group 2	The difficulty index
Remembering	10	13	20	0.65
Understanding	10	11		0.55
Applying	10	8		0.4

The next step is to compare item difficulty in both groups (table 5).

Table 5: Comparison of item difficulty in both groups.

Cognitive level	Item difficulty		
	in Group 1	in Group 2	difference
Remembering	0.75	0.65	0.1
Understanding	0.75	0.55	0.2
Applying	0.65	0.4	0.25

According to the results, no significant difference is found in the questions at the remembering level between Groups 1 and 2 (0.1). However, more significant differences are observed in the questions at the understanding comprehension and applying application levels (0.2 and 0.25, respectively). As the cognitive complexity of tasks increases according to Bloom's taxonomy, students in Group 2 exhibit a higher frequency of errors.

The result supports the hypothesis that the students taught through the CBI method demonstrate superior vocabulary acquisition compared to the group instructed by the GTM. This can be attributed to the fact that the activities based on the CBI approach are more meaningful, engaging, and motivating. Additionally, visualization and contextualization prove to be beneficial.

4 DISCUSSION

CBI and GTM differ in methodological backgrounds, so they are expected to result in different outcomes in vocabulary acquisition in ESP teaching. The vocabulary acquisition is divided into three stages (table 6).

Table 6: Stages of the vocabulary acquisition.

Stages	Group 1	Group 2
Presenting new terms	Visual aids	Translation
Practicing exercises	L2 (target language) exercises	L1-L2/L2-L1 exercises
Vocabulary assessment test	Multiple-choice est in L2	Multiple-choice test in L2

4.1 Presentation of new terms

To approbate the CBI approach, the theme "Suspension system" is chosen. The text for reading is taken from an electronic coursebook "English for Mechanics" by May (2005). It should be noted that the theme is rather essential for learning, however, it is included in none of the above-mentioned Ukrainian coursebooks in ESP for Mechanical Engineering students. To initiate the lesson, a word cloud is employed as a lead-in. The word cloud, generated using a digital tool called *Word Art*, is based on the text "Suspension System". It serves to introduce students to a new topic, activate their prior knowledge about the subject, and functions as an introductory stage of the lesson (figure 1).

ESP teachers might consider the following steps in their procedures for vocabulary instruction (Tumolo, 2007):

1) a source of new words presentation;

Figure 1: Word cloud.

2) activities done for understanding the meaning of the words;

3) creation of memory links and retention of the word form and meaning.

The following techniques can be used in the semantization process (Jata, 2018):

1) visualization;

2) definitions and explanation;

3) matching;

4) synonyms or antonyms;

5) guessing from the context.

A visual technique for semantization of Mechanical Engineering terms has been chosen for our research since visualization is one of the most efficient memorization strategies. Besides, verbal techniques are useful to explain more abstract concepts. Visualization is the way that can enable students to guess the meaning of unknown words and comprehend a text (Ghaedi and Shahrokhi, 2016). Visual learners can create mental images related to target words that help them memorize and store them in their long-term memory (Mohd Tahir and Tunku Mohtar, 2016). It should be noted that the visual method is rather relevant for students because a suspension system in L1 is familiar to them.

In Group 1, new terms are presented by visual aids before reading the text. The key terms are Shock absorber, Upper control arm, Coil spring, leaf spring, Stabilizer, Ball joints, Front hanger, and Rear shackle. The students should find these words in the image and guess their meaning (figure 2).

In Group 2, new terms are introduced by providing translations into Ukrainian, following the principles of the GTM. After the new terms are introduced, students from both groups read the text "The suspension system":

The suspension system of a car has two main functions. Firstly, it must keep all four road wheels in contact with the road, so that steering, braking, and the transmission drive can operate properly. Secondly,

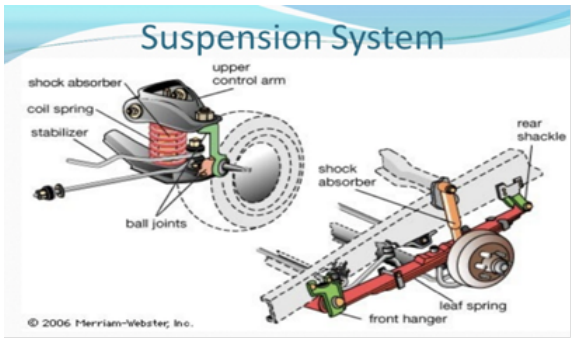


Figure 2: Suspension system.

the suspension system must offer passengers maximum comfort. The two functions are never quite compatible, so engineers always make a compromise. The main suspension components in modern cars are leaf springs, coil springs, wishbones, torsion bars, shock absorbers, and McPherson struts. Leaf springs are leaves of tempered steel clamped together and fastened to the chassis by a shackle at one end, a pivot at the other. Coil springs are often used together with wishbones to give an independent front suspension. McPherson struts also offer independent front suspension. They use a coil spring together with a shock absorber. The spring absorbs bumps, while the shock absorber dampens (stabilizes) up and down bouncing. A torsion bar is springy steel that absorbs bumps by twisting and untwisting. Torsion bars are often part of the front-end suspension unit.

4.2 Practicing new terms

The acquisition of new terms takes place within a single lesson lasting 85 minutes.

4.2.1 Practicing new terms in Group 1

We provide vocabulary acquisition for Group 1 based on CBI principles:

1) students' prior knowledge can help or hinder learning. When students can connect new information with knowledge and beliefs that they had previously, they will remember more and learn more quickly;

2) the more interrelationships among concepts, and the stronger and clearer those relationships, then the better a learner's understanding and ability to apply the concepts to new problems and new situations;

3) students' motivation determines, and directs;

4) to combine content and language lesson objectives in one class period;

5) scaffolding: when teachers create supportive conditions in which the student can participate and extend their current skills and knowledge to reach higher levels of competence;
6) no L1 (native language) in classes.

The principal types of post-reading activities for mastering new terms are as follows:

1. Matching exercises
2. Gap-filling exercises
3. True/false exercises
4. Categorization of words
5. Multiple-choice exercises
6. Answering questions

We agree with Myshak (2018) that the efficiency of assimilation of terms and their active use in oral and written professional speech depend in many respects on the appropriate system of exercises consistently aimed at both thorough understanding of terminology and enhancement of speaking and listening skills necessary for the application of this terminology to specific situations.

According to the CBI principles, students need to encounter new vocabulary in a variety of meaningful settings and activities. The activities divised by the authors offer opportunities for the students in Group 1 to learn and practice the newly introduced vocabulary words:

Task 1. Match the terms (1-7) with their definitions (A-G):

1. Suspension
2. Wishbones
3. Spring
4. Strut
5. Shackle
6. Torsion
7. Steering

A) the collection of components, linkages, etc. which allows any vehicle (car, motorcycle, bicycle) to follow the desired course;
B) the twisting of an object due to an applied torque;
C) a U-shaped piece of metal secured with a clevis pin or bolt across the opening;
D) system of components allowing a machine (normally a vehicle) to move smoothly with reduced shock;
E) Devices that are used to control the front wheels of automobiles;
F) an elastic object that stores mechanical energy;
G) components of an automobile chassis, can be passive braces to reinforce the chassis and/or body, or active components of the suspension.

Task 2. Fill in the gaps:

1) The main suspension components in modern cars are. . . .
2) The suspension system must offer passengers. . .
3) A torsion bar is springy steel that absorbs bumps by. . . .
4) The . . . stabilizes up and down bouncing.

Task 3. Tick the false statements:

1) The suspension system of a car has four main functions.
2) Steering, braking, and the transmission drive must operate properly.
3) The main suspension components in modern cars are leaf springs and coil springs.
4) Coil springs are leaves of tempered steel clamped together and fastened to the chassis by a shackle at one end, a pivot at the other.

Task 4. Match a part of the suspension system (1-4) with its function (a-d) and read the sentences:

1. Suspension system
2. Coil springs
3. Ball joints
4. Shock absorbers

a) To support the coil spring to further reduce the impact of a bump or pothole;
b) To connect your steering knuckles to the control arms;
c) To maximize the friction between your car's tires and the road;
d) To absorb the impact when a vehicle hits a bump in the road.

A stem sentence can be given as a model: "The function of the ... is to ..."

Task 5. Answer the questions:

1) What are the functions of the suspension system of a car?
2) What are the main suspension components?
3) Is a torsion bar used for speeding?
4) Are torsion bars and shock absorbers often used together to give independent front suspension?

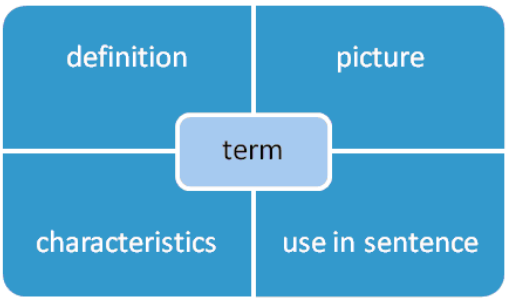


Figure 3: Frayer model.

The students are expected to study the new terms outside the class, where they should create the Frayer model (figure 3).

The Frayer model is an effective way to help the students understand the meaning of new words, use them correctly in sentences, and construct derivatives.

As an out-of-class activity, the students are also asked to create a mind map illustrating the components and functions of a suspension system. The digital tools such as Mind Meister, Canva, Wise mapping can be applied. Mind maps facilitate students' engagement, and help them recall and solidify new terms. Additionally, students are expected to review the new terms using flashcards on the Quizzlet platform.

Thus, the given set of vocabulary activities provides students with numerous exposures to new vocabulary in meaningful and contextualized ways. The activities create memory links and enhance retention of a word form and its meaning.

4.2.2 Practicing new terms in Group 2

Following the principles of the grammar-translation method (Milawati, 2019), and imitating a set of activities in above-mentioned GMT-related Ukrainian coursebooks, we designed the following vocabulary activities for Group 2:

Task 1. Read and translate the text "The suspension system" (see 3.1).

Task 2. Answer the questions:

1) What are the functions of the suspension system of a car?
2) What are the main suspension components?
3) Is a torsion bar used for speeding?
4) Are torsion bars and shock absorbers often used together to give independent front suspension?

Task 3. Match the terms (1-7) with their definitions (A-G):

1. Suspension
2. Wishbones
3. Spring
4. Strut
5. Shackle
6. Torsion
7. Steering

A. the collection of components, linkages, etc. which allows any vehicle (car, motorcycle, bicycle) to follow the desired course;

B. the twisting of an object due to an applied torque;

C. a U-shaped piece of metal secured with a clevis pin or bolt across the opening;

D. system of components allowing a machine (normally a vehicle) to move smoothly with reduced shock;

E. Devices that are used to control the front wheels of automobiles;

F. an elastic object that stores mechanical energy;

G. components of an automobile chassis can be passive braces to reinforce the chassis and/or body, or active components of the suspension.

Task 4. Find the examples of Passive Voice in the text.

Task 5. Translate the sentences from English into Ukrainian.

Task 6. Translate a text from Ukrainian into English.

The final activity is rather time-consuming to be assigned as an in-class task. However, it would not be reasonable to propose it as an out-of-class task, as students might apply machine translation.

A table summarizing the information about activities in both groups enables to compare them (table 7).

Table 7: Comparison of vocabulary activities in both groups.

Criteria	Group 1	Group 2
Using the mother tongue	-	+
Cognitive load	Not high	High due to translation skills
Relevant / irrelevant	Relevant	Activities involving translation are irrelevant: they are time-consuming, and students can translate them using ChatGPT/MT
Vocabulary exposure	Much high	Little low
Using digital tools	+	-

Thus, translation activities not only focus on key content vocabulary but also on passive vocabulary and grammar structures, leading to the split-attention effect and high cognitive load.

4.3 Vocabulary assessment tasks and questionnaire

The vocabulary assessment multiple-choice test is conducted at the next lesson in both groups. The total number of questions is 30. They are supposed to be distributed at the first three levels, *remembering (items 1-10), understanding (items 11-20)*, and *applying (items 21-30)*, of Bloom's taxonomy.

These three cognitive levels are relevant for new vocabulary acquisition. The number of mistakes made in the test on this or that cognitive level enables calculating an item difficulty. The formula looks like this: the number of students who answer a question correctly (c) is divided by the total number of students in the group who answered the question (s). The answer equals a value between 0.0 and 1.0, with harder questions resulting in values closer to 0.0 and easier questions resulting in values closer to 1.0. The formula is: c ÷ s = p (Renner, 2018). We calculate the item difficulty for both groups separately (table 3 and table 4).

The cognitive levels are not marked in the test, and the students can not see them. One sample question for each level is provided:

Level of remembering:

What is the term for the part of the suspension system that connects the wheel to the vehicle's body?

a) Shock absorber
b) Control arm
c) Sway bar
d) Strut

Level of understanding:

How does the suspension system contribute to vehicle stability during cornering?

a) By reducing vibrations and shocks
b) By maintaining optimal tire contact with the road
c) By adjusting the ride height automatically
d) By controlling the engine's power output

Level of applying:

You want to enhance the off-road capabilities of your vehicle. Which suspension component should you consider upgrading?

a) Shock absorbers
b) Coil springs
c) Control arms
d) Sway bars

Qualitative data are collected from the students' questionnaires (table 2). Information about their attitude towards the method applied in the lesson was collected. Four evaluation criteria are included: vocabulary presentation, meaningful activities, cognitive load, and engagement/interest.

5 ANALYSIS OF DATA OBTAINED

The pedagogical experiment is conducted to compare the CBI approach and the GTM at the vocabulary acquisition stage in ESP classes. Methods of mathematical statistics are applied to data processing.

As a null hypothesis H_0, it is assumed that there is no significant difference between students who are taught using the grammar-translation method (GTM) and students who are taught using the CBI approach to enhance students' vocabulary acquisition. Alternative hypothesis H_1, implies that there is a significant difference between students who are taught using the GTM and those who are taught using the CBI approach to enhance their vocabulary acquisition.

To prove or reject the hypotheses stated, the results in the experimental and control groups are compared before and after the experiment applying the CBI principles by using the Wilcoxon-Mann-Whitney's test. The Mann-Whitney U test is used to compare differences between two independent samples when the sample distribution is not normal and the sample sizes are small $n < 30$). When analyzing the results of the experiment, the use of this criterion is advisable, since for the obtained samples the requirement of a normal distribution for the t-criterion is not met, and this was confirmed by constructing frequency histograms for both groups. Based on the test results, tables are compiled for calculating the rank sums for students' samples in both groups. The SPSS Statistics software is used to calculate the criterion. The empirical value of the criterion U is calculated by the formula:

$$U = n_1 \cdot n_2 + \frac{n_x(n_x+1)}{2} - T_x$$

where:

n_1 is the number of students in the experimental group;

n_2 is the number of students in the control group;

n_x is the number of students in the group with a higher rank sum;

T_x is the larger of the two rank sums.

The empirical value of the Wilcoxon criterion is determined from the ratio:

$$W_{exp} = \frac{|\frac{n_1 \cdot n_2}{2} - U|}{\sqrt{\frac{n_1 \cdot n_2 \cdot (n_1 + n_2 + 1)}{12}}}$$

The critical value is determined according to the corresponding table at the significance level of 5%.

The empirical value of the vocabulary acquisition criterion at the beginning of the control stage of the experiment is in the insignificance zone, that is, there is no significant difference in the knowledge level among the students of the experimental and control groups. The empirical value of the Mann-Whitney U-criterion at the end of the control stage of the experiment $W_{emp} = 2.29$ is compared with the critical value $W_{0.05} = 1.96$. Since $W_{emp} > 1.96$, we can conclude that the reliability of the differences in the characteristics of the compared samples is 95%. It enables rejecting hypothesis H_0 about the CBI principles proposed in the study at the stage of terminological vocabulary acquisition. However, the alternative hypothesis about the impact of that approach on the level of terminological vocabulary acquisition among future mechanical engineers is accepted.

6 CONCLUSIONS

A comparative analysis of the CBI and the GTM for ESP lessons is conducted. The results are obtained on the basis of the students' questionnaires, and a multiple-choice vocabulary test.

The data obtained demonstrate the superiority of the CBI approach over the traditional GTM in terms of effective vocabulary acquisition for Mechanical Engineering students in ESP. Throughout the conducted investigation, the objectives have been achieved. We can conclude that vocabulary learning involves a certain amount of memorization. Learning words in context (as facilitated by the CBI approach) is regarded as more effective. Teaching students how to practice circumlocution rather than going straight to translation is giving them a valuable skill. It also gives them more practice with L2. Students encounter new vocabulary in a variety of meaningful settings and activities. CBI activities can provide repetition and exposure that is indispensable for vocabulary acquisition.

The research results enable to sum up the advantages and disadvantages of both methods (table 8).

The questionnaire responses of students in Group 1 showed that they enjoyed doing vocabulary activities and did not find it difficult to do the final vocabulary assessment test. Motivation and interest contribute to positive outcomes in learning. On the contrary, students in Group 2 reveal a negative attitude towards the vocabulary activities. Thus, CBI principles are eligible to be applied in ESP classes.

Table 8: Benefits and drawbacks of the CBI and the GTM.

The CBI	The GTM
Using no mother tongue	Using the mother tongue
Appropriate for bilingual groups	Inappropriate for bilingual groups
Introducing new vocabulary in context, and engaging manner	Introducing new vocabulary using the mother tongue
Developing a profession oriented lexical competence	Developing translation competence is irrelevant for STEM students
Stimulating, rewarding	Boring
More challenging for a teacher	More challenging for a student

Analysis of data obtained enables us to develop recommendations for implementing CBI principles in vocabulary acquisition in ESP classes:

1) supply meaningful topics and texts;
2) categorize new words into technical terms and general English words;
3) introduce vocabulary via visual aids;
4) take students' cognitive load into account;
5) use motivating and stimulating vocabulary activities with digital tools (word clouds, Frayer models, infographics, mind maps, etc.).

Further research prospects involve analysis of applying CBI to mastering listening and speaking skills for Mechanical Engineering students in ESP classes.

REFERENCES

Ahmadi-Azad, S. and Kuhi, D. (2016). ESP Vocabulary Instruction: A Comparison of CBI vs. GTM for Iranian Management students. *Asean Journal of Teaching and Learning in Higher Education (AJTLHE)*, 8(2):35–50. https://ejournal.ukm.my/ajtlhe/article/view/18853.

Bakirova, H. B. (2020). Formation of terminological competence in ESP education. *JournalNX- A Multidisciplinary Peer Reviewed Journal*, 6(11):63–68. https://tinyurl.com/mswvhzmj.

Benati, A. (2018). Grammar-Translation Method. In *The TESOL Encyclopedia of English Language Teaching*, pages 1–5. John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118784235.eelt0153.

Bolitho, R. and West, R. (2017). *The internationalisation of Ukrainian universities: the English language dimension*. Stal, Kyiv.

https://www.britishcouncil.org.ua/sites/default/files/2017-10-04_ukraine_-_report_h5_en.pdf.

Brown, H. and Bradford, A. (2017). EMI, CLIL, & CBI: Differing approaches and goals. In Clements, P., Krause, A., and Brown, H., editors, *Transformation in language education*. JALT, Tokyo. https://jalt-publications.org/files/pdf-article/jalt2016-pcp-042.pdf.

Cauli, E. (2021). Implementing CLIL approach to teaching ESP in academic contexts in Albania. *Journal for Research Scholars and Professionals of English Language Teaching*, 5(25). https://www.jrspelt.com/wp-content/uploads/2021/05/Eda-CLIL-Approach.pdf.

Chirobocea, O. (2018). A case for the use of translation in ESP classes. *Journal of Languages for Specific Purposes*, (5):67–76. https://www.researchgate.net/publication/323858764.

Costeleanu, M. (2019). The Role Of Vocabulary In Esp Teaching. In Soare, E. and Langa, C., editors, *Education Facing Contemporary World Issues*, volume 67 of *European Proceedings of Social and Behavioural Sciences*, pages 996–1002. Future Academy. https://doi.org/10.15405/epsbs.2019.08.03.120.

Dearholt, J. (2015). *Career Paths: Mechanics*. Express Publishing, London.

Echevarría, J., Vogt, M., and Short, D. J. (2010). *Making Content Comprehensible for Multilingual Learners: The SIOP Model*. Allyn & Bakon. https://tinyurl.com/5n999k9u.

Elizondo González, J. F., Pilgrim, Y., and Sánchez Víquez, A. (2020). Diseño de un curso esp para estudiantes de ingeniería mecánica. *InterSedes*, 21(43):78–102. https://doi.org/10.15517/isucr.v21i43.41979.

Ghaedi, R. and Shahrokhi, M. (2016). The impact of visualization and verbalization techniques on vocabulary learning of Iranian high school EFL learners: A gender perspective. *Ampersand*, 3:32–42. https://doi.org/10.1016/j.amper.2016.03.001.

Ivanov, O., Beshta, O., and Dolhov, O. (2013). *Anhliyska mova dlya studentiv elektromekhanichnykh spetsialnostey [English for Mechanical Engineering Students]*. Natsionalnyy hirnychyy universytet, Dnipropetrovsk.

Izidi, R. and Zitouni, M. (2017). Esp Needs Analysis: the Case of Mechanical Engineering Students at the University of Sciences and Technology Oran U.S.T.O. *Revue des études humaines et sociales -B/ Littérature et Philosophie*, (18):16–25. https://doi.org/10.33858/0500-000-018-054.

Jata, E. (2018). Teaching ESP Terminology- Case Study Agricultural University of Tirana (AUT). *European Journal of Language and Literature*, 4(3):22–27. https://doi.org/10.26417/ejls.v4i4.p22-27.

Khazaal, E. N. (2019). Investigating and Analyzing ESP College Students' Errors in Using Synonyms. *International Journal of English Linguistics*, 9(5):328–339. https://doi.org/10.5539/ijel.v9n5p328.

Leshchenko, M., Lavrysh, Y., and Halatsyn, K. (2018). The role of content and language integrated learning at Ukrainian and Polish educational systems: Challenges and implication. *Advanced Education*, 5:17–25. https://doi.org/10.20535/2410-8286.133409.

Maharani, A. V. and Putro, N. H. P. S. (2020). Item Analysis of English Final Semester Test. *Indonesian Journal of EFL and Linguistics*, 5(2):491–504. https://doi.org/10.21462/ijefl.v5i2.302.

Marinov, S. (2016). Translation Exercise Aided by Data-driven Learning in ESP Context. *ESP Today*, 4(2):225–250. https://doi.org/10.18485/esptoday.2016.4.2.5.

Mart, C. T. (2013). The Grammar-translation Method and the Use of Translation to Facilitate Learning in ESL Classes. *Journal of Advances in English Language Teaching*, 1(4):103–105. https://european-science.com/jaelt/article/view/281.

May, T. (2005). *English for Mechanics*. Lulu.com.

Milawati (2019). Grammar Translation Method: Current Practice In EFL Context. *Indonesian Journal of English Language Teaching and Applied Linguistics*, 1(4):187–196. https://doi.org/10.21093/ijeltal.v4i1.437.

Mohd Tahir, M. H. and Tunku Mohtar, T. M. (2016). The effectiveness of using vocabulary exercises to teach vocabulary to ESL/EFL learners. *Pertanika Journal of Social Sciences & Humanities*, 24(4):1651–1669. http://www.pertanika.upm.edu.my/resources/files/Pertanika%20PAPERS/JSSH%20Vol.%2024%20(4)%20Dec.%202016/23%20JSSH-1459-2015.pdf.

Myshak, E. (2018). Forming terminological competence of future specialists of the agroindustrial and environmental branches by foreign language means. *Euromentor Journal*, 9(3):68–76. https://www.proquest.com/openview/efe56e75eddf819a36d827997be06552/1?pq-origsite=gscholar&cbl=1316370.

Quero, B. and Coxhead, A. (2018). Using a Corpus-Based Approach to Select Medical Vocabulary for an ESP Course: The Case for High-Frequency Vocabulary. In Kırkgöz, Y. and Dikilitaş, K., editors, *Key Issues in English for Specific Purposes in Higher Education*, pages 51–75. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-70214-8_4.

Renner, R. (2018). How to Calculate Difficulty Index. https://www.theclassroom.com/test-standardized-6680561.html.

Shestopal, O. and Slobodyanyuk, A. (2017). *Anhliyska mova dlya inzheneriv-mekhanikiv [English for mechanical engineers]*. VNTU, Vinnytsya.

Tumolo, C. H. S. (2007). Vocabulary and reading: teaching procedures in the ESP classroom. *Linguagem & Ensino*, 10(2):477–502. https://www.researchgate.net/publication/255593986.

Vanichvasin, P. (2019). Effects of Content-Based Instruction on English Language Performance of Thai Undergraduate Students in a Non-English Program. *English Language Teaching*, 12(8):20–29. https://doi.org/10.5539/elt.v12n8p20.

Zarichna, O., Buchatska, S., Melnyk, L., and Savchuk, T. (2020). Content and Language Integrated Learn-

ing in Tertiary Education: Perspectives on Terms of Use and Integration. *East European Journal of Psycholinguistics*, 7(1). https://eejpl.vnu.edu.ua/index.php/eejpl/article/view/295.

International School of Young Scientists as a New Form of Professional Scientific Growth of Educational Institutions of Higher Military Education of Ukraine

Iryna Trubavina[1,2][a], Oleksandr Cherednychenko[3][b], Kyrylo Nedria[4][c], Svitlana Klimova[5][d] and Kateryna Kalina[6][e]

[1]*Luhansk Taras Shevchenko National University, 7 Vokzalna Str., Lubny, 37500, Ukraine*

[2]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[3]*Institute of Legal Personnel Training for the Security Service of Ukraine, Yaroslav Mudryi National Law University, 77 Pushkinska Str., Kharkiv, 61024, Ukraine*

[4]*Dnipropetrovsk State University of Internal Affairs, 26 Gagarina Ave., Dnipro, 49005, Ukraine*

[5]*Education and Research Institute "Institute of Public Administration", Kharkiv National University named after V. N. Karazin, 75 Heroiv Kharkova Ave., Kharkiv, 61001, Ukraine*

[6]*Kharkiv National Medical University, 4 Nauky Ave., Kharkiv, 61022, Ukraine*

trubavina@gmail.com, ch.a.u@ukr.net, k.nedrya@gmail.com, svitlana@dergachi.net, kalinahnpu@gmail.com

Keywords: Scientific Activity, Content of the Program, Theoretical Approaches, Young Scientists, International School, Non-Formal Education, Security and Defense Sector.

Abstract: The relevance of the research topic is due to the need to raise the military science of Ukraine to the level of world standards for the implementation of scientific activity, the ethics of the behavior of scientists, the presentation of results and achievements, as well as the transition of military affairs to international standards, the European integration of Ukraine, which requires the internationalization of military science, professional informal communication and joint scientific activity, new forms of scientific knowledge and education with the preservation of military secrecy, the specifics of military professional activity. The purpose of the article is to substantiate the essence, content, methods, conditions of preparation and conduct of the school. The research methods were on: 1. Theoretical: pedagogical analysis literature; synthesis and generalization; 2. Empirical: pedagogical experiment, observation and individual conversations, questionnaires, focus groups, express surveys. The scientific novelty of the article is: theoretical foundations of such education (complex of scientific approaches: competence, activity, system, environmental, ethical, theory of blended learning, distance learning, content of education, digital learning, digital pedagogical competencies, problem-oriented learning, theory of adult education, ideas of Waldorf pedagogy, developmental education (according to L. V. Zankov), personal, democratic.), its essence, content, methods of implementation, stages and conditions of preparation and implementation. The practical significance of the research is: methods of identifying stakeholder needs, features of material selection for such an event. The prospects for further research are the organization of the following events taking into account the needs of scientists in the war.

1 INTRODUCTION

The process of reforming the sphere of science and education in Ukraine made it possible to move it to the best world standards, a single global scientific space. Today, Ukraine has a large number of higher education institutions (HEIs), as well as departmental HEIs (DHEIs). The operational management of the Ministry of Science and Education of Ukraine (MES) does not include a large part of departmental higher education institutions, primarily military and special ones. At the same time, they all have common problems that require solutions. Thus, the problem of forming scientific consciousness and an individual scientific style of professional activity, teaching the logic of scientific research are urgent tasks for the

[a] https://orcid.org/0000-0003-1057-430X
[b] https://orcid.org/0000-0002-5304-5662
[c] https://orcid.org/0000-0002-9370-1900
[d] https://orcid.org/0000-0002-5106-6873
[e] https://orcid.org/0000-0002-4252-7690

Trubavina, I., Cherednychenko, O., Nedria, K., Klimova, S. and Kalina, K.
International School of Young Scientists as a New Form of Professional Scientific Growth of Educational Institutions of Higher Military Education of Ukraine.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 61-72
ISBN: 978-989-758-579-1

image, accreditation, licensing, and rating of DHEIs. It should be noted that military science is characterized by certain limitations regarding open access to the work of foreign partners, a certain closedness and limitation of the scientific environment of the Armed Forces of Ukraine, scientific discussions due to a small number of specialists who are often subordinate to each other. Departmental restrictions and bureaucracy do not contribute to the development of science, for example, the regulatory framework of the Ministry of Education and Culture and military departments often contradicts each other. The presence of a significant number of closed specialized scientific councils for the defense of dissertations reduces the level of access to scientific achievements and their discussion, inhibits the academic mobility of scientists of higher education institutions.

Therefore, cooperation is needed in the scientific professional growth of scientific and pedagogical workers (SPW), between domestic and foreign higher education institutions, between higher education institutions and higher education institutions, between young scientists and experienced ones for the exchange of scientific activity experience. Previously, such activity would have been prohibited due to military secrecy and the secrecy of military teams from civilian life (Viiskova osvita, 2011). Today, the following changes are being implemented in the Higher Education and Higher Education Institutions: transition of military teams and armed formations of Ukraine to NATO standards, implementation of the competence approach, ensuring the requirements of the National Agency for Quality Assurance of Higher Education for the quality of education. This is possible under the conditions of maintaining the requirements for working with information with limited access and providing information that is open and generally scientific. It should be noted that professional growth of SPWs is their duty under the Law of Ukraine "On Higher Education" (Verkhovna Rada of Ukraine, 2014), it can be carried out in the form of internships, advanced training, scientific schools, webinars, seminars, etc. Until 2022, there were almost no international scientific trainings at DHEIs. There were projects to train teachers in foreign languages, soft skills, etc. by the British Council, the Ministry of Defense of Canada. The ability to conduct scientific research was not developed at the DHEIs and in the programs for obtaining the scientific degree of Ph.D. It was only about training in the educational component of the programs in research methods and methodology, pedagogical skills and professional disciplines from the specialty. Practical issues regarding the fulfillment of requirements for qualified scientific works were not the focus of such programs. The issue of conducting scientific research was also absent in the programs for obtaining a master's degree at DHEIs. Although some programs had "Methods and methodology of scientific research" disciplines, they did not provide a holistic view of scientific activity and its practical implementation.

Existing research in the military sphere and the available experience, which demonstrate the results of scientific research and work for their approval, were considered during the international scientific and practical conferences "Educational and scientific support of the activities of the components of the security and defense sector of Ukraine" (Osvitno-naukove zabezpechennia diialnosti skladovykh sektoru bezpeky i oborony Ukrainy, 2021); "Philosophical-sociological and psychological-pedagogical problems of training a military professional in a globalized world" (Ministerstvo oborony Ukrainy et al., 2021). Separate studies of military education are dedicated to the methodology of scientific research, and according to the definition of Medvid et al. (2021), each level of methodology and theory of scientific knowledge contributes its vision to the solution of the problem and allows us to outline the range of issues that it solves (Trubavina, 2022). Oliynyk (2021) defined the forms and methods of training future masters of military and social management, which is important for the further improvement of forms, conducting international schools. Kozubtsov (2017) claims that the development of the methodological culture of adjuncts during the period of study at the adjunct must be in inseparable unity with the scientific school, organized on the new basis of scientific and methodological support (Kozubtsov, 2017, p. 30). Boiko (2020) argued for carrying out scientific research on the problem of training military leaders on the basis of scientifically based concepts of leadership (Boiko, 2020, p. 37). A competent approach should be the basis of the content of all training of military and civilian military personnel. These studies reveal the common foundations of conducting scientific research. Some of the scientific activities at the Military Academy are conducted even with the involvement of international organizations and the Military Academy (Trubavina et al., 2021), which demonstrates a certain openness of scientific research in military science. At the same time, systematic training in the practice of integral scientific activity in the Higher Education and Research Institute was not the subject of attention of science managers and scientists. Today, this deficiency is compensated by the multifaceted informal education and experience of individual scientists of higher education

institutions, their personal authority in science and opportunities for cooperation. Scientific circles, scientific schools, master classes, scientific laboratories, webinars, methodological seminars of departments, seminars of individual professors on scientific topics, trainings on various aspects of scientific activity can be highlighted.

Internationality is present at many events of HEIs, which allows the exchange of experience and training, internships at the best world models. An example is the annual spring and autumn international scientific schools at H. S. Skovoroda Kharkiv National Pedagogical University, in which for a week graduate students from different cities and countries immerse themselves in scientific activity and the atmosphere of science, which includes getting acquainted with the lives of great scientists (for example, H. S. Skovoroda museum in the village of Skovorodinivka), lectures by leading scientists, exchange of experience, trainings, excursions, etc. The international conference at the same institution is dedicated to current problems of pedagogy and psychology of higher and secondary schools, is held online with master classes and trainings, with co-organizers and participants from all over the world. These are the best samples of scientific thought with attention to every study from student to academic. The conference is held over 3 days, with 300+ participants. Military scientists who have a non-secret topic of scientific activity often take part in such events. At the same time, they and other participants do not see such a scale and scientific activity in their HEIs of this scale, which to some extent underestimates the level of scientific achievements of the military.

It should be noted that when compiling the content of the programs of international science schools in HEIs, the wishes of the degree holders are not taken into account. As a rule, their topics come from the resources of the school's organizer of higher educational institutions, scientific achievements and research of professors. The school program should select the speakers and their topics, and not the conditions of higher education institutions will determine the purpose and content of education. This means that an international school will be successful when its content is built on the needs of all stakeholders of the educational process, when the difficulties in the scientific work of young scientists are taken into account in the school program, and the speakers will come from Ukraine and the world, higher education institutions and higher education institutions are those who correspond to the topic and can speak at the event. Note that this is either work under a grant or on public grounds in Ukraine for speakers and co-organizers. And this is non-formal education, which should not repeat the subject of the educational and scientific program of those obtaining a scientific degree or a master's degree, but should supplement it with what young scientists need. Therefore, the format of the international school as a form of informal education for young scientists of higher education and higher education is relevant, adequate and useful. This article is devoted to the justification of the content and results of the work of such a school. These questions became the purpose of the article.

2 RESEARCH METHODOLOGY, METHODS AND MATERIALS

To achieve the goal, we used the following scientific approaches: competence-based (we form research competence in all participants); activity (certain qualities, skills and competences can be formed only in the relevant activity); systemic (we take into account non-formal education as a subsystem of the educational program); environmental (learning through the creation of an educational and scientific environment), ethical; theories of blended learning, distance learning, content of education, digital learning for conducting an online school; problem-oriented learning, an androgogical approach to learning based on their own experience; ideas of Waldorf pedagogy regarding learning by epochs; developmental (learning at a fast pace at the level of theoretical concepts and categories followed by independent practice of skills in practice); personal (educates through the personality of a scientist); democratic (taking into account needs).

We used the following methods of scientific research:

1. Theoretical: theoretical analysis of sources on the problem to determine the format of the event and its content; synthesis and generalization for creating a school program, clarifying the difficulties of scientists, identifying similar experience in Ukraine and abroad;
2. Empirical: a pedagogical experiment to identify the effectiveness of Program 1 of the International School of Young Scientist of the Security and Defense Sector; individual conversations, surveys of all stakeholders; express survey of listeners regarding satisfaction with her program.

We will present the content of the entrance questionnaire. Questionnaire questions were formulated taking into account the purpose of the school and

to adjust the topics of the speeches. The exit questionnaire provided for identifying the results of the school's work, finding out whether the needs of the applicants were met, which are questions for the future.

Express-survey of participants was interactive, electronic and required an answer to 1 question – are you satisfied with your participation in the work of the school? A) Yes; B) Partially; C) No.

The questions for interviews with academic leaders were: What are the difficulties in writing and conducting scientific research for your applicants? What do they ask you most often? What mistakes do you often see in the works of graduate students and associate professors? What should you pay attention to in school? The questions for the heads of higher education institutions and departmental higher educational institutions, leaders of possible members of the organizing committee were as follows: What issues, in your opinion, should be included in the school program? Do you like the topic of the speeches? What can be added to them, taking into account the interests of DHEIs? The results of the surveys resulted in an information sheet outlining a list of topics for the school's performances for future participants of the school.

The pedagogical experiment to check the effectiveness of the school was carried out in the following stages:

1. Diagnostic – provided for the definition of criteria and performance indicators. We chose motivation as a criterion for the effectiveness of the school's work, since it did not include training and exercises for the formation of skills, but was focused on teaching the basic concepts and categories of science at a fast pace in a generalized form with specification and advice for further independent practice of skills in practice when writing your work Stakeholders' satisfaction with the school was also a criterion. We chose cognitive needs as an indicator of satisfaction.

2. Formative – the school itself was held, classes with students according to the program.

3. Final – an exit survey was conducted regarding the effectiveness of the school.

Then the results were compared, the effectiveness of the school was revealed.

3 METHODS OF ORGANIZING AND CONDUCTING THE INTERNATIONAL SCHOOL OF YOUNG SCIENTISTS

The 1st International School of Young Scientists of the Security and Defense Sector (1st ISYSSDS) was held on February 3-4, 2022 at the National Academy of the National Guard of Ukraine (NANGU) and included the following stages of work:

1. Organizational stage. With the aim of forming the organizing committee, selecting experts who wish to speak, co-organizers of DHEIs and HEIs, interested teachers and managers of DHEIs were told about the idea, the proposal to join the organizing committee and speakers, agreements were made with DHEIs and HEIs, questionnaires, questions for express surveys, interviews were drawn up, focus groups, the form of work of 1st ISYSSDS was selected. This made it possible to train a larger number of scientists. The choice of the form of education was determined by the educational goal. The school is a non-formal education for those obtaining a scientific degree. It is concentrated in time to immerse the participants in the scientific development environment. We have the idea of advancing at a fast pace and learning in epochs what the participant needs most, which excludes spending time on motivating and stimulating the participants, activating their attention and concentrating their attention on the topic of the performances. The school provided for learning through listening, asking questions and understanding listeners for further independent application in practice. School is a format of habitual communication in an educational environment, when it is necessary to convey a lot of material quickly to a large mass of listeners.

As for the organizing committee of the 1st ISYSSDS, it was formed from among experienced scientists and scientific leaders, like-minded people who wanted to go beyond the boundaries of one DHEIs and with joint efforts to do a good job in military education and science to help scientists and spread the best examples of scientific activity. The members of the organizing committee volunteered to become: the Government Commissioner of the CMU on gender policy, rectors and vice-rectors of HEIs and DHEIs – co-organizers of the event, well-known scientists who had interesting scientific achievements. All of them had something to say to the participants, and the topics of their speeches were discussed in the context of the relevance of the program, identified problems and difficulties of graduate students and adjuncts. The following list of in-

stitutions – co-organizers was received on this basis: Government Commissioner for Gender Policy of the CMU; Ukrainian and foreign higher education institutions and higher education institutions, the Council of Young Scientists at the Ministry of Education and Culture. Not everyone who wanted to speak and convey their thoughts on scientific research was able to participate in the first school – there was not enough time in the program, their reports can be used in the next event. All members of the organizing committee and speakers were warned about the free participation in the event and its freeness for the participants, the issuance of certificates of the member of the organizing committee and the school participant. At this stage, technical support for the event was organized with the participation of a large number of people through BigBlueButton.

2. Diagnostic stage. It was conducted with the aim of identifying the needs of those seeking education, compiling the content of the program. Answers to the entrance questionnaire and applications were received from 198 participants from 25 institutions of higher military education and civilian higher education institutions, both domestic and foreign. Among the participants were citizens of Ukraine, the People's Republic of China, and the EU. According to this questionnaire, the following answers were received from future participants of the school (these are adjuncts of higher education institutions and graduate students of civilian higher education institutions), they could choose several answers to the questions at the same time (table 1).

So, from table 1 we can see the interest of all topics for the participants, we put the most interesting topics for the majority in the program. These questions did not concern military secrecy, only the conduct of scientific research, are open for discussion. On the other hand, we were interested in the problems of scientists from other countries in their scientific activities. We interviewed post-graduate students from the People's Republic of China and the EU (15 people, various higher education institutions) about what worries them about science. It turned out to be the same questions. The exception was the problem of the procedure for the protection of scientific works, their registration, which are different in different countries. Regarding the desire of the heads of the DHEIs and HEIs institutions: to speed up the running of the school and asked what help is needed, there was a desire to include a gender approach in scientific research, issues of working with information with limited access and academic integrity.

The results of all surveys resulted in an information sheet, which outlined the list of topics for the school's presentations as follows: On February 3-4, 2022, the 1st International School for young academics of the security and defense sector, who want to improve the quality of their scientific activities, master modern technologies of creative scientific research and expand the scientific and educational environment of interaction with colleagues from different regions of Ukraine. During the work of the school, it is planned to conduct classes for young scientists of the security and defense sector by leading scientists of Ukraine from various areas of organization, methodology of conducting scientific research, preparation and defense of dissertations, etc. Based on the results of the scientific forum, it is planned to issue a collection of reports with the assignment of a DOI digital identifier, to send the presentations of the speeches to the participants, and to post a recording of the speeches on the YouTube video hosting site. The subject of the classes was given. After sending out the information letter, NANGU started receiving applications from future participants.

3. The stage of direct implementation of the school program. On the basis of surveys of all the main stakeholders of the school, we compiled a curriculum taking into account the approaches to its formation. All speakers made presentations, which were then received by all participants along with certificates. We present the content of the program (table 2).

The main method was informative messages in the form of advice from scientists lasting 20-30 minutes from speakers with the opportunity for listeners to ask questions in the chat for the speakers. This is due to the difficulty of feedback and the use of online interactive methods with a large number of participants for speakers and technical support. At the same time, we did not foresee exercises for 2 days of school work, since the task of applying this in practice corresponds to the individual independent work of everyone on their topic, and the speakers did not have the opportunity to work individually with each of the 198 participants during these 2 days. But it does lead to thoughts about creating an ongoing webinar and blog with advice for degree seekers on methodological and practical tips for advancing academically. And repeating the school after a certain period of time with a new program. Therefore, the school is the first. We expect 2, 3 and further schools after the victory of Ukraine in the war with the Russian Federation. It should be noted that the theoretical material was combined with examples of its application, which meant concretization and visual teaching methods. Speeches included methods of activating the attention of listeners: addressing the audience, showing errors and difficulties, using diagrams, tables, complete and incomplete

Table 1: Entrance questionnaire.

Question	Answer options	Survey results
1. What difficulties do you have when writing a scientific work?	a) choosing a topic; b) substantiation of the scientific apparatus; c) theoretical review of the state of development of the problem; d) writing professional articles; e) writing articles in scientometric databases; g) use of mathematical statistics methods; g) substantiation of research methodology and theory; h) registration of scientific work; i) something else, specify.	a) 101 people (51%) b) 136 people (69%) c) 140 people (71%) d) 98 people (49%) e) 180 people (91%) yes) 87 people (44%) g) 101 people (51%) z) 80 people (40%) i) passing the process of preliminary defense, defense, issues of plagiarism check, academic integrity, idea generation, patience and calmness while working on the dissertation, receiving grants and participation in scientific projects, working with information with limited access, etc. – 147 people (74%)
2. What are your expectations from participating in the event (school)?	a) obtaining new useful information; b) the opportunity to communicate and get to know like-minded people; c) the opportunity to check the correctness of one's scientific investigations; d) formation of research skills; e) something else, specify.	a) 98 people (49%) b) 36 people (18%) c) 24 people (12%) d) 89 people (45%) e) getting a vision of what a scientific work is and how to write it, what is scientific novelty and how to find it, learn how to write a scientific text – 102 people (51%)
3. Are you interested in the subject of classes within the event (school)?	a) yes; b) partially; c) no.	a) 198 people (100%) b) 0 c) 0
4. What subject of classes arouses the greatest interest?	*provide an answer*	– methodology of scientific research in the security and defense sector – 102 people (52%); – gender approach in scientific research of forces of the security and defense sector – 61 people (31%); – methods and methodology of dissertation work – 78 people (39%); – use of the regulatory framework in the dissertation work – 88 people (44%); – preparation and submission of scientific publications to journals included in international scientometric databases (Scopus, Web of Science, etc.) – 134 people (68%); – preparation of scientific professional articles and theses of reports – 156 people (79%); – methods of conducting scientific research and experimental work – 122 people (62%); – theoretical foundations and state of development of the dissertation problem – 145 people (73%); – work with scientific text: methodical recommendations – 102 people (52%); – academic integrity in scientific research of the security and defense sector, prevention of corruption risks – 140 people (71%); – compliance with information with limited access in scientific research – 121 persons (61%); – publications abroad and internships in EU countries, participation in EU scientific projects – 88 people (44%); - grants in the EU for scientific research. Fundraising activities – 68 people (34%). – creativity in scientific work. How to develop it – 90 people (45%)

Table 2: Program of the 1st ISYSSDS.

Time	The topic of the speech
1st day (February 3, 2022)	
12.30-12.40	Opening of the school, greetings from the members of the school's organizing committee
12.40-13.10	How to choose a topic for scientific research and stages of work on it
13.10-13.40	How to write a literature review for a dissertation, which is the theoretical basis of scientific research
13.40-14.00	Methodology and technique in scientific military-pedagogical research: essence and content
14.00-14.20	Opportunities for foreign publications and internships in Slovakia
14.20-15.15	Break
15.15-16.00	Academic integrity in scientific research in the security and defense sector, prevention of corruption risks. Compliance with Ukrainian legislation in the process of working with information with limited access in scientific research
16.00-16.30	Ukrainocentrism – origins, challenges, answers of scientific research
16.30-17.00	Stress resistance in the work on the dissertation
17.00-17.10	Break
17.10-17.40	Demarcation of legal acts according to the signs of their normativity during scientific activity
17.40-18.00	Preparation of scientific professional articles and theses of reports
2nd day (February 4, 2022)	
12.30-13.00	How to turn from an adjunct into a scientific and pedagogical employee of DHEIs
13.00-13.30	Gender approach in scientific research of the security and defense sector
13.30-14.00	Modern trends in educational measurements to improve the quality of training of specialists in the security and defense sector of Ukraine
14.00-14.15	The importance of the creation and functioning of the Councils of Young Scientists in the Military Academy of the Security and Defense Sector of Ukraine (based on the experience of the National Academy of Land Forces named after Hetman Petro Sahaidachny)
14.00-15.00	Break
15.00-15.30	Grants in the EU for scientific research. Fundraising activity
15.30-16.00	Working with a scientific text: methodical recommendations
16.30-17.00	Creativity in scientific work. How to develop it
17.00-17.30	Preparation and submission of scientific publications to journals included in international scientometric databases (Scopus, Web of Science, etc.)
17.30-18.00	School closing. Summing up. Delivery of certificates

comparisons, highlighting the main point, presentations, rhetorical questions, examples, explanations, switching attention by the teacher, using techniques of attracting involuntary attention. All speakers were experienced lecturers and prepared for speeches in advance, consulted among themselves and with the organizing committee regarding the content of the speech and its design, communicated with each other as like-minded people on how to do it better and more clearly. Therefore, teamwork was present not only at the stage of forming the content of the program, but also during the school. The performances were from different places in Ukraine and from abroad, it was difficult to unite everyone in time, for everyone to find a convenient time, free from work and classes, the Internet connection did not always work and the performances sometimes changed places, some people were sick with COVID-19 and performed together with one of their colleagues in a pair, because they could not speak for a long time. But the school was held, the program was maintained.

4. The final stage – with the aim of identifying the level of satisfaction of needs and solving problems, identifying issues for clarification for the future.

It should be noted that among the 198 participants there were also collective connections, where there were whole groups of masters, assistant professors and postgraduate students in the audience, who connected centrally in their educational institution. Therefore, the 1st ISYSSDS aroused considerable interest among applicants with its subject matter. During the 2 days of work, the listeners were not excluded from work, photographed the presentations, actively asked questions to the speakers, registered on time and returned from the break. This indicates great motivation for learning and correctly chosen topics of speeches. The express survey showed that 98 percent of students were completely satisfied with the school

Table 3: The results of the survey.

Question	Answer options	The results
1. Did your expectations from the school come true?	a) yes; b) partially; c) no.	a) 194 (98%); b) 4 (2%); c) 0
2. Which report aroused the greatest interest?	*provide an answer*	– methodology of scientific research – 78 (39%); – writing articles and theses – 36 (18%); – writing articles in Scopus and Web of Science journals – 39 (20%); – literature review – 52 (26%)
3. What topics would you like to add to the school's work program in the future (provide an answer)?	*provide an answer*	Publication of scientific articles abroad (such as Scopus, Web of Science) – 17 (6%)
4. What forms of work would you like to see at school?	*provide an answer*	As much practice as possible – 67 (34%)
5. What was useful about this school for your research?	*provide an answer*	– methodological part – 57 (29%); – literature review – 32 (16%); – writing articles –36 (18%)
6. Should such measures be carried out in the future?	a) yes; b) it is difficult to say; c) no.	a) 186 (94 %); b) 12 (6 %); c) 0
7. Which of the speakers did you like the most?	*provide an answer*	Miroshnichenko V. – 32 (16%), Kalashnyk L. – 42 (21%), Trubavina I. – 39 (20%), Semyonova A. – 36 (18%), Cherednichenko O. – 42 (21%), Volkova N. – 52 (26%), Nedria K. – 48 (24%)
8. What did you not like at school?	*provide an answer*	There was no time for practice

(table 3).

The results of the interactive express survey also showed that 98% of students are satisfied with the school. The survey was conducted immediately after school closed.

Individual conversations with students and their academic supervisors generally confirmed these statements. The wishes were to make such a school regular, with practical exercises, which confirms our opinion about the expediency of the event, its benefit for scientists, compliance with the needs of degree holders, and their motivation to participate in the event. It should be noted that all the students were constantly present at the school on the 2nd day, asked questions in the chat, and even their supervisors listened in order to learn from their colleagues based on their experience. 98% of fully satisfied listeners means that the miners' needs were met. Even the format of the online school, with a fast-paced progression in theory followed by presentations and speeches, made a great impression on the trainees, although the trainees wanted practice. We note that practice is possible with individual feedback to everyone, which was technically impossible with online training of 198 people. There is a question about the pulsating form of the school – with tasks performed on a regular basis, a permanent seminar for those obtaining a scientific degree, checking of tasks and consultations, which requires the paid participation of speakers and project activities for the school. This is a perspective for further actions in this direction and is a debatable issue. The first school fulfilled its tasks – it united people, motivated them to participate in scientific activities, exchange experiences, provided the necessary knowledge and information for reflection. Moreover, she discovered a team of reserve speakers for the future who would like to share their creations. Interest was aroused by the presentations and theses of the speeches, which all listeners received by mail along with certificates. The recording of the school in YouTube was not taught due to the start of the war, and the promised manual was also not issued, since almost half of the speakers went to fight. But despite this, even the oral part online and communication through mail revealed the unconditional benefit of the event and its relevance to the needs of stake-

holders. Heads of educational institutions expressed their gratitude for the event, were surprised by its massiveness, the fact that people voluntarily kept in touch at the non-formal education event. Those seeking education expressed their admiration for the event and their surprise that science is both interesting and free. I also liked the program – everything is useful and reflects their needs. The speakers were also satisfied – they were listened to very attentively, with great motivation to learn. Winners even took photos of presentation slides and took notes. The scientific supervisors of the adjuncts and graduate students expressed their gratitude for the fact that the topics of the speeches were relevant, the new and classic requirements for dissertations were explained clearly, briefly and clearly, examples of the fulfillment of the requirements were provided, and the theory was connected with practice. All stakeholders appreciated the quality of the speeches, the interesting content of the program and the high level of the speakers' performances. We note once again that the entire project of the school was on a public basis, using the base of NANGU and other educational institutions – co-organizers. A positive feature is that there were 25 DHEIs and HEIs represented at the event, domestic and foreign. There were performances by foreign participants as well as Ukrainian, civil and military. The commonality of problems and topics, interesting and useful to every scientist, determined the success of the event and its high evaluation. Thus, the requirements for a scientific online school were met. The content of the program, which was justified on the basis of the needs of stakeholders, turned out to be necessary.

4 DISCUSSION

We conducted the first such school in the security and defense sector. It is interesting to compare its content and results with other schools and the results of their work (Trubavina et al., 2021; Diundyk, 2018; International School of Biology in Poland, 2017; Shevchenko, 2012). In comparison with the work of international scientific schools, the following common and distinctive features can be identified (figure 1).

Therefore, 1st ISYSSDS had the right to exist in this form in comparison with other schools, they are all different depending on the approach, purpose, opportunities and needs of the participants and co-organizers.

5 CONCLUSION

Based on the above, we can say that:

1. The international school is a relevant and possible form of informal education of young scientists of institutions of higher military education of the security and defense sector of Ukraine in the conditions of European integration and the transition of military affairs in the country to international standards. We discovered that school education should be built on a complex of theoretical approaches, namely: competence, activity, system, environmental, ethical, theory of blended learning, distance learning, selection of educational content, digital learning, digital pedagogical competencies, problem-oriented learning and theories of adult education (androgogic approach), ideas of Waldorf pedagogy, developmental (according to L. V. Zankov), personal, democratic approaches.
2. The content of the program of such an event of informal education is determined on the basis of identifying and taking into account the needs of all stakeholders of the educational and scientific process, which ensures the motivation to study of young scientists, the democratization of education and its maximum effectiveness. The subject of the school program concerns the methods and conditions of carrying out scientific activity, integrity, takes into account the features of working with information that are common to civilian and military scientists, and not characteristic of the content of a separate military science, contributes to the formation of an individual scientific style of activity in young scientists and encourages independent creating conditions for scientific search. The methods of education in such an event of non-formal education are, taking into account its fast pace, the number of questions of the program and the huge number of participants, which complicates feedback and the implementation of exercises and discussions, are information, examples, exchange of experience, analysis of regulatory documentation, etc. At the same time it is important to exchange the experience of scientific activity between foreign and native scientists, experienced and young scientists, civilian and military scientists, and scientific supervisors.
3. The conditions for the success of schools in the security and defense sector are: its international character in terms of speakers and participants, the combination of civilian and military institutions of higher education, its separate preparation and organization as a complex project. A

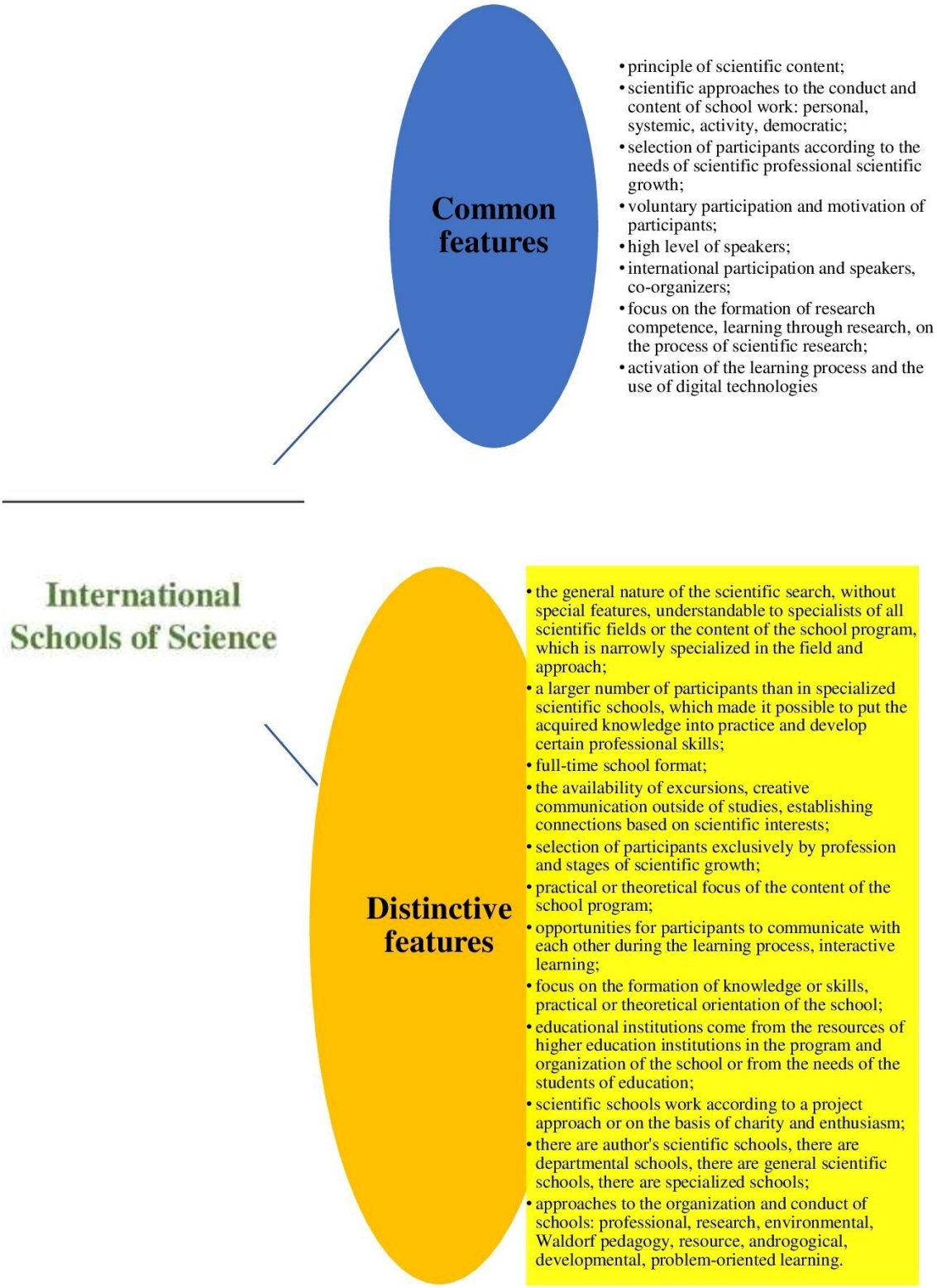


Figure 1: Common and distinctive features of international schools of scientists.

school of this level can be implemented as a charity project on public grounds or as a grant project. But there are many organizational works before, during and after its implementation.

4. The International School of Young Scientists of the Security and Defense Sector is defined by us as a complex form of informal education, a separate large-scale scientific project that requires special organization and training by various institutions of higher education, coordination of work in a single center on the basis of which it is conducted. The school must be planned and have stages of implementation: diagnostics and taking into account the needs of stakeholders in the content, formulating the content of the school program simultaneously with the formation of the organizing committee and speakers who are chosen according to the school's theme, and not according to the capabilities and resources of one educational institution (it should be a motivated team of like-minded people with experience and high own results of scientific activity, with democratic communication and distribution of duties and responsibilities), provision of the technical component of preparation and conduct of the school, its actual conduct and moderation of sessions, analysis of its results and feedback.

   Motivation of speakers and listeners is required, which ensures attention and interest in the program.

5. Questionnaires to identify the needs of stakeholders, content of the school program, effective methods for its implementation, stages and conditions of its organization and implementation were identified as practical achievements of the research.

The prospects for further research are the organization of the II International School of Young Scientists of the Security and Defense Sector in Ukraine, taking into account the needs and capabilities of scientists in the war, clarifying the needs of stakeholders in the results of scientific activity in this difficult time.

REFERENCES

Boiko, O. V. (2020). *Teoriia i metodyka formuvannia liderskoi kompetentnosti ofitseriv Zbroinykh syl Ukrainy*. Vyd. O. O. Yevenok, Zhytomyr. https://lib.iitta.gov.ua/722942.

Diundyk, O. (2018). Mizhnarodna naukova shkola-seminar "Metamovy slovnykiv riznykh typiv: budova ta zastosuvannia" [The international scientific school-seminar "Metalanguages of the dictionaries of the different types: structure and use"]. *Ukrainska mova*, (3):148–151. https://ekmair.ukma.edu.ua/handle/123456789/15243.

International School of Biology in Poland (2017). Mizhnarodna shkola z biolohii u Polshchi [International School of Biology in Poland]. http://tinyurl.com/3pear5ca.

Kozubtsov, I. (2017). Kontseptsiia rozvytku metodolohichnoi kultury adiunktiv [The concept of development of methodological culture adjuncts]. *Viiskova osvita*, (1):83–94. http://nbuv.gov.ua/UJRN/vios_2017_1_13.

Medvid, M., Ivashchenko, P., Britchenko, I., Trubavina, I., and Liutyi, V. (2021). Decision support information and analytical technology in discharge military personnel employment. *SHS Web Conf.*, 107:05001. https://doi.org/10.1051/shsconf/202110705001.

Ministerstvo oborony Ukrainy, Natsionalnyi universytet oborony Ukrainy imeni Ivana Cherniakhovskoho, and Instytut psykholohii imeni H.S. Kostiuka NAPN Ukrainy (2021). *Filosofsko-sotsiolohichni ta psykholoho-pedahohichni problemy pidhotovky viiskovoho profesionala u hlobalizovanomu sviti (11 lystopada 2021 r.)*. NUOU, Kyiv. https://nuou.org.ua/nauka/confi/konf-21-11-11.html.

Oliynyk, L. V. (2021). *Theoretical and Methodical Bases of Training in Special Military Disciplines of Future Masters of Military-Social Management*. The thesis is for obtaining the scientific degree of the Doctor of Pedagogical Sciences in Speciality 13.00.02 – Theory and Methodology of Training (General Military and Special Military Disciplines), Bohdan Khmelnytskyi National Academy of the State Border Guard Service of Ukraine, Khmelnytskyi. https://nrat.ukrintei.ua/searchdoc/0521U101953.

Osvitno-naukove zabezpechennia diialnosti skladovykh sektoru bezpeky i oborony Ukrainy (2021). *Osvitno-naukove zabezpechennia diialnosti skladovykh sektoru bezpeky i oborony Ukrainy : tezy II Mizhnarodnoi naukovo-praktychnoi konferentsii (Khmelnytskyi, 25 lystopada 2021 roku)*. Vyd-vo NADPSU, Khmelnytskyi. http://tinyurl.com/22d8z7f2.

Shevchenko, V. V. (2012). V Mizhnarodna naukova shkola-seminar "Istoriia torhivli, podatkiv ta myta". *Ukrainskyi istorychnyi zhurnal*, (2):226–227. http://nbuv.gov.ua/UJRN/UIJ_2012_2_21.

Trubavina, I. (2022). Teoretyko-metodolohichni osnovy suchasnoho naukovo-pedahohichnoho doslidzhennia. In Boichuk, Y. et al., editors, *Metodolohiia suchasnykh naukovykh doslidzhen : zb. nauk. pr. za rezultatamy KhVIII Mizhnar. nauk.-prakt. konf., prysviach. 300-richchiu H. S. Skovorody, Kharkiv, 12–13 trav. 2022 r.*, pages 41–43. KhNPU im. H. S. Skovorody, Kharkiv. https://dspace.hnpu.edu.ua/handle/123456789/9851.

Trubavina, I. M., Mirshuk, O. Y., and Chuprinova, N. Y., editors (2021). *Sotsialni aspekty viiskovo-profesiinoi diialnosti sektora bezpeky i oborony: vyklyky sohodennia : zb. tez dopovidei I Mizhnar. nauk.-prakt. konf., 20 travnia 2021 r., m. Kharkiv*. Nats. akad. Nats. hvardii Ukrainy, Kharkiv. https://nangu.edu.ua/uploads/files/

documenty/Naukova%20diyalnist/naukovu%20forumy/2021/zbirnyk%20tez%20dopovidei%20socialni%20aspekty%20NANGU%2B.pdf.

Verkhovna Rada of Ukraine (2014). Law of Ukraine "On Higher Education". https://zakon.rada.gov.ua/laws/show/1556-18?lang=en#Text.

Viiskova osvita (2011). *Viiskova osvita*. Nats. un-t oborony Ukrainy im. Ivana Cherniakhovskoho, Kyiv.

Competitiveness of National Higher Education Institutions in the International Market of Educational Services: The Case of Ukraine

Liudmyla Kalashnikova[1][a], Liudmyla Chernous[1][b], Olena Lakomova[1][c], Tetiana Karpenko[1][d] and Olena Zavalniuk[2][e]

[1]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[2]*Kryvyi Rih Mining and Technological Lyceum, 1L Elistinska Str., Kryvyi Rih, 50000, Ukraine*

{*lvkalashnikova198, chigik4, lakomova.k.r, tkazakova1810, zavalniukelena*}*@gmail.com*

Keywords: International Market of Educational Services, Foreign Students, Higher Education, Export of Educational Services.

Abstract: The article outlines the features of the functioning of the international market of educational services, as well as its national segments, in particular, on the example of Ukraine. Particular attention is focused on the organization of training for foreigners in Ukrainian higher education. The advantages and disadvantages of Ukrainian higher educational institutions in comparison with other exporting countries are determined. The analysis of the statistical materials of the ratings of Ukrainian universities, presented in the systems of international assessment, as well as the data of the Ukrainian State Center for International Education on the possibilities of exporting higher education. The experience of conducting sociological surveys among foreign students studying at Ukrainian universities is generalized. Based on the analysis, recommendations were developed to improve the competitiveness of Ukrainian higher educational institutions in the international market of educational services.

1 INTRODUCTION

As is well known, as a result of increasing globalization, all spheres of public life have been transformed, as the main factors of development in the modern world have been the production, dissemination and use of knowledge. The field of educational services is no exception, which has recently been characterized by trends of integration, internationalization, academic mobility, rapid development of educational marketing, export/import of educational services, in particular through the introduction of information and communication technologies.

Developed countries today are actively competing for leadership in the international market of educational services. Intending to strengthen its position on it, the European Union has created a single educational and scientific space for higher education (European Research Area) within the framework of the Bologna Process, while pursuing political, economic and scientific and educational goals. As of the end of 2020, 48 countries have joined the region, including Ukraine, which signed the Bologna Declaration on May 19, 2005 (Khomeriki, 2015).

Over the years of implementation of the principles of the Bologna Process, the Ukrainian market of educational services has undergone significant changes. Namely, there has been a liberalization associated with the easing of institutional constraints on the formation of educational content and the organization of the management process. Thus, as a result of debureaucratization and decentralization reforms, Ukrainian higher education institutions have been able to freely choose their areas of operation, which is undoubtedly an extremely important factor in improving their efficiency and thus competitiveness in the international market of educational services.

Thus, in this article, the authors aim to analyze the theoretical and methodological foundations for studying the competitiveness of national higher education institutions in the international market of educational services, as well as to study the state and problems of the functioning of the national segment of higher education that provides services for foreign students,

[a] https://orcid.org/0000-0001-9573-5955
[b] https://orcid.org/0000-0003-0916-7205
[c] https://orcid.org/0000-0002-7798-2263
[d] https://orcid.org/0000-0002-7340-0238
[e] https://orcid.org/0000-0001-6093-732X

Kalashnikova, L., Chernous, L., Lakomova, O., Karpenko, T. and Zavalniuk, O.
Competitiveness of National Higher Education Institutions in the International Market of Educational Services: The Case of Ukraine.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 73-84
ISBN: 978-989-758-579-1

to determine the trends that dominate in state strategic plans and programs, based on the requirements of consumers of educational services.

To achieve this goal, it is necessary, firstly, to analyze the theoretical and methodological foundations for studying the competitiveness of national higher education institutions in the international market of educational services, secondly, to analyze the existing national and international trends in the functioning of the higher education market, thirdly, on the basis of empirical research to identify and analyze the requests of foreign students for the provision of educational services in Ukraine, fourthly, to identify the reasons for the slowdown in the development of the national segment of the international market of educational services and, fifthly, to outline possible directions for continuing research in this area in Ukraine.

The theoretical significance of the study lies in the fact that the accumulated and processed material contributes to an increase in the efficiency of work in the matter of creating a Ukrainian brand of higher education and its promotion in the international market of educational services. The practical significance of the work lies in the possibility of its use as a basis for developing a strategy to increase the competitiveness of Ukrainian higher educational institutions. This study is important not only for the Ukrainian scientific community, the political establishment and the higher education system in terms of optimizing approaches to the development of the national market of educational services in the field of higher education, but also for other countries cooperating with Ukraine in this area, including companies, who invest or plan to invest their finances in the development of higher education in Ukraine.

2 LITERATURE REVIEW

The original concept of matching educational services to the demands of the global market was proposed by Lombardi et al. (2001), who noted that the competitiveness of higher education institutions depends linearly on the level of uniqueness and high productivity of the academic community and internal quality. Among the leading factors in the international competitiveness of universities, Altbach (2003) focused on the ability of higher education institutions to conduct breakthrough research that can be evaluated and disseminated worldwide, the availability of highly qualified faculty, high levels of academic mobility, transparency and efficiency. University management, availability of proper logistics. Unlike his predecessors, Horta (2009) believed that the international competitiveness of national higher education institutions is determined by their belonging to a group of countries with dominant scientific systems, as well as a high level of internationalization of educational and scientific space.

Pavlenko and Antonyuk (2014) noted that the key factor in the competitiveness of national higher education institutions is the degree of autonomy granted to them, the ability to show initiative and entrepreneurship in the process of adapting to the demands of the global market of educational services. However, no less important factors of success are intellectual capital, innovation systems, international cooperation and financial opportunities.

The problems of internationalization of higher education, as well as the integration of the European educational space were studied by Varghese (2008), Knight (2004), Ammigan (2020), Londar et al. (2020), Stepanenko and Debych (2017), Abuselidze and Zoidze (2023). Instead, Levchenko and Plynokos (2015) focused on clarifying the possibilities of exporting educational services by higher educational institutions of Ukraine, and Rayevnyeva et al. (2020) – on the factor conditionality of their competitiveness.

Despite numerous scientific studies of the peculiarities of the functioning of international and national markets of educational services, ensuring the competitiveness of higher education institutions implemented by both foreign and Ukrainian authors, Ukraine's position in this context is insufficiently studied and needs to be clarified, in particular judgments of foreign students. Most of the presented studies are devoted to the analysis of economic factors of competitiveness, while the social component of this process requires clarification and additional study. The relevance of conducting sociological research of the higher education system is increasing in connection with the introduction of a higher education development strategy aimed primarily at meeting the needs of students and potential stakeholders.

3 MATERIALS AND METHODS

The design of the study of the competitiveness of Ukrainian higher education institutions in the international market of educational services was based on the use of a mixed methodology, i.e. a combination of general scientific and special, quantitative and qualitative methods, the choice of which was determined by the goals and objectives of this study.

In this work, the authors used general scientific methods. In particular, the authors used traditional

and critical analysis, synthesis, induction, deduction, comparative historical method, statistical analysis method, desk analysis of documents and reports of public services for analytical understanding of the state and features of the provision of educational services to foreign students. To identify the problems that exist in the provision of educational services, as well as the reasons hindering its development, the method of critical analysis and analysis of expert opinions was used. To study the requests of the population for the provision of educational services, the method of analyzing secondary data was used the results of sociological studies conducted in Ukraine. The use of forecasting and scenario planning methods made it possible to determine the main trends in the development of the national higher education market.

4 THEORETICAL CONSTRUCT

The international market of educational services as an independent segment of the economy is a system of relations between producers, suppliers and consumers, interacting in the process of production and sale of a kind of product – educational services. The starting point for its operation should be considered in 1995, when the World Trade Organization approved a general agreement on trade in services, in which educational services were separated into a separate sector.

According to Savytska et al. (2016), educational service can be defined as a socio-economic phenomenon, which is characterized by: intangibility (there is no actual ability to touch or even measure, because only intellectual capital is evaluated as a result of learning, the only material evidence about receiving an educational service there is a documentary certificate in the form of a diploma of higher education); inseparability from the source (it is a question of belonging to a concrete institution of higher education, educational services cannot exist outside the organizational structure of the education system); instability of quality (due to the dynamism of the education system, as well as the lack of full standardization, the quality of educational services can be controlled only at the time of its provision); synchronicity/asynchrony of production and consumption processes (on-line learning mode provides coincidence in time and space of production and consumption processes, while in off-line mode these processes are asynchronous). With this interpretation in the international market, educational services take the form of a commodity product, acting as formalized knowledge, competency systems of students or educational programs, learning technologies produced by teachers.

On the other hand, the provision of educational services can be defined as a social process characterized by relative duration in time and space, the obligation of interaction of subjects and objects of learning, delayed detection of results, openness of information, personnel and other exchanges. In this case, educational services should be understood as a combination of material and technical base, scientific and pedagogical staff, organizational culture, international and national partners, as well as communication channels.

In accordance with the provisions of the General Agreement approved by the World Trade Organization, educational services are implemented in four ways (Aydrus and Filippov, 2008):

1) “consumption abroad” involves the movement of the consumer to the country where the service is provided;
2) provision of educational services remotely with the help of information and communication technologies;
3) commercial presence of the organization-provider of educational services of one country and territory of another in the format of functioning of representations, branches;
4) the presence of representatives of the organization-provider of educational services provides for academic transnational mobility of individuals to provide educational services.

The first method is traditional, its implementation does not require additional efforts from the exporting country, it involves the provision of educational services for full-time, part-time or distance learning. Instead, the other three cross-border methods involve a thorough analysis of the national markets for educational services in importing countries, primarily through empirical marketing research to study demand, potential opportunities to open branches of higher education institutions, academic mobility, and so on. Extremely important for cross-border forms of export of educational services is the organizational stage associated with the legal registration of branches, structural units, the availability of appropriate logistics, the ability to move capital, selection of teaching staff, training. The organization of distance learning of foreign students involves the creation of an appropriate legal framework and the appropriate level of use of modern information and communication technologies.

Recent trends in the international market for educational services require national higher education systems to be competitive, namely to be able to provide training for innovative professionals based on

modern training models in accordance with the demands of both national and international labor market in a highly skilled workforce. When assessing competitiveness as a whole set of capabilities of an educational institution, it is advisable to apply a comprehensive approach that allows to take into account various aspects of the functioning of the higher education system.

In particular, Rayevnyeva et al. (2020) emphasize such components of the competitiveness of higher education institutions as:

1) rational and effective organizational structure of the educational institution; availability of quality management system for training;
2) highly competitive mobile educational programs that are able to fully meet the demands of the labor market;
3) established innovative educational process;
4) flexible system of scientific and technical, administrative and economic and business communication. Thus, the leading factors influencing the ability of national higher education institutions to compete in the international market of educational services are the implementation of a customer-oriented approach, the possibility of mixed financing, innovation and investment potential, stimulating domestic productivity, academic mobility and comprehensive monitoring. quality of educational services.

Levchenko and Tsarenko (2016) identified the possibility of using a number of empirical methods to assess the level of competitiveness of higher education institutions, including the method of expert evaluations, surveys of participants in the educational process, statistical and economic-mathematical analysis, profile method, SWOT and PEST analysis, ranking method, etc. Among these methods, the latter is the most popular, given its functionality for integrated assessment.

According to the Observatory on Academic Ranking and Excellence, there are more than 100 academic rankings in the world today. The most famous of which are Academic Ranking of World Universities (ARWU), QS World University Rankings (QS), Times Higher Education (THE), Universitas21 (U21) (Hou and Jacob, 2017).

The last of these methods of assessing the activities of national markets for educational services U21 provides for the definition of 29 indicators, grouped by such categories as (Larionova, 2012):

1) resources (sources of funding);
2) environment (assessment of gender parity in the academic environment among teachers, availability of access to relevant statistical information on the state of development of the higher education system, its structure, quality of student training, teacher mobility, probability of attracting foreign teachers, etc.);
3) relations (assessment of the scale and effectiveness of international cooperation, implementation of research activities);
4) effectiveness (number of scientific publications, the level of their citation, the level of coverage of the population with higher education, the number of scientists in the country, the unemployment rate among the population with higher education, etc.).

However, we believe that the method of expert assessments and surveys of participants in the educational process is more effective in caring for the direct involvement of informants as consumers of educational services in the development of programs to increase the competitiveness of higher education institutions.

5 FEATURES OF THE MARKET OF EDUCATIONAL SERVICES INTERNATIONAL AND NATIONAL TRENDS

Due to historical reasons, namely the leadership in the world economy, the leading providers of educational services in the international market are the United States (20% of the total foreign nationals studying abroad), Great Britain (10%), Canada (9%), China (9%) Australia (8%), France (6%), Russia (6%), Germany (5%), Japan (4%) and other countries (23%). Despite the fact that the United States still remains the leader among countries exporting education, the rating has changed somewhat over the past 20 years – Western European countries have lost to Canada, China and Russia (table 1) (Institute of International Education, 2020).

Over time, the United States has become increasingly difficult to maintain its leadership position as competition in the international market for educational services continues to increase. The greatest successes are achieved in countries where education operates mainly at the expense of the state or mixed public-private funding. For such countries, education is a leading tool for global competitiveness, as the government invests primarily in the development of

Table 1: Rating of countries-exporters of educational services 2000-2020, % of total foreign nationals studying abroad.

Country	Year	
	2000	2022
United States	28	20
UK	14	10
Germany	12	9
France	8	9
Australia	7	8
Japan	4	6
Spain	3	6
Canada	2	5
Belgium	2	4
Austria	2	2
All others	18	21

international educational ties. Unfortunately, today Ukraine is not among the world leaders in the provision of educational services, but its current state in this area does not correspond to the existing educational potential.

Despite the fact that the United States leads the ranking of countries exporting educational services, the total number of educational institutions reaches 4.3 thousand, the number of foreign students in American higher education institutions does not exceed 5.5% of the total number of students. Similar figures in other countries are significantly higher. For example, in Russia this figure is 8.5% with a total of 766 universities, in Poland – 6.4%, 397 higher education institutions, respectively. While the UK has a much smaller number of higher education institutions and 172 universities, one in four students comes from another country (table 2) (Institute of International Education, 2020).

The most popular among foreign students who studied in 2019 in the US were such areas of training as engineering (22.7%), mathematics and computer science (20.0%), business and management (18.0%). Instead, in the UK and Poland – business and management, as well as social sciences. Russia and Poland have the highest among other countries in the training of medical professionals (table 3) (Institute of International Education, 2019).

Also in Russia and Poland, foreign students studying for bachelor's degree programs are significantly more prevalent than in other countries, where both the first (bachelor's) and second (master's) levels of training are almost equally represented (table 4) (Institute of International Education, 2019).

Ukrainian higher education institutions have sufficient potential to fight for the share of the market of educational services at the international level. Today, Ukraine has one of the densest networks of universities: 6.7 universities and 8 colleges, technical schools and colleges per 1 million Ukrainians. While the same figure in Poland is 9.2 universities and similar educational institutions, in Russia – 5.8, Germany – 4.3, the UK – 3.7, respectively (Verkhovna Rada of Ukraine, 2022).

According to the State Statistics Committee, as of the beginning of 2021, there are 515 universities and similar educational institutions in Ukraine (table 5). Structurally, the Ukrainian segment of higher education is represented by: 29.0% universities, 23.0% institutes, 11.0% academies, 19.0% separate departments, 1.0% research centers, 17.0% other research institutions and organizations. Of these, 64.5% are based on state property, 12.2% – communal and 23.2% – private, corporate (State Statistics Committee of Ukraine, 2023). A similar ratio of the number of state-owned higher education institutions to individuals is typical of Germany and Russia. In Poland and the United Kingdom, on the other hand, the situation is the opposite: there are significantly more private universities than public ones.

Ukraine is characterized by a high level of professional training of teaching staff of higher education institutions – every second teacher has the degree of Candidate of Sciences, every tenth – Doctor of Science.

The total number of students in Ukraine is 1.422 million people, of whom 44.0% study at the expense of the state budget, the rest (56.0%) – at the expense of individuals. Given the distribution of graduate students by training, Ukrainian institutions of higher education train specialists in socio-economic and humanitarian fields (44.0%), engineers (16.0%), physicians (8.0%), teachers (7.0%), transport workers (6.0%), specialists in natural sciences (4.0%), architects and builders (3.0%), service workers (3.0%) and others (State Statistics Committee of Ukraine, 2023).

According to the results of 2020, Ukraine took 36th place in the ranking of national systems of higher education Universitas21, gaining 47.8 points out of 100 possible (Williams and Leahy, 2020). Of the 280 existing Ukrainian higher education institutions, only 6 are leading in the ranking. In particular, Kharkiv National University named after V. Karazin, which took 491 positions out of 1002 represented world institutions of higher education, is followed in the ranking of Ukrainian universities by Kyiv National University named after T. Shevchenko, National Technical University "Kharkiv Polytechnic Institute", National Technical University "Kyiv Polytechnic Institute named after I. Sikorsky", Sumy State University, National University "Lviv Polytechnic".

In the ranking of the Times Higher Education in

Table 2: Characteristics of the higher education system, 2020.

Country	United States	UK	Australia	Russia	Germany	Poland
International students as percentage of total higher education	5.5%	22.3%	31.3%	8.5%	11.7%	6.4%
Public institutions	1659	167	53	500	270	130
Private institutions	2639	5	87	266	159	267

Table 3: Inbound students by field of study 2019, % of the total number of foreign citizens studying abroad in the country.

Field of study / Country	United States	UK	Australia	Russia	Germany	Poland
Engineering	22.7	11.0	10.6	21.9	26.4	7.8
Business and Management	18.0	26.7	40.5	18.6	15.6	28.6
Mathematics and Computer Sciences	20.0	6.6	13.2	3.8	10.8	7.2
Other/Unspecified Subject Areas	8.5	8.1	9.9	7.7	4.5	10.2
Social Sciences	8.3	14.3	6.8	2.7	6.8	18.5
Physical and Life Sciences	8.0	9.6	4.9	4.8	8.6	0.7
Fine and Applied Arts	6.2	6.9	3.7	2.4	7.9	3.7
Health Professions	3.5	6.6	7.4	15.7	5.3	13.3
Education	1.7	2.5	2.0	9.1	1.2	2.7
Humanities	1.7	7.2	0	10.4	10.9	6.2
Agriculture	1.4	0.5	1.0	2.9	2.0	1.1

2020 among 92 countries, Ukraine is represented by 11 higher education institutions, where in addition to the above, the activities of Kharkiv National University of Radio Electronics, Ivan Franko National University of Lviv, Kyiv National Economic University, National University were evaluated “Ostroh Academy”, Chernihiv National Technological University (Times Higher Education, 2020).

According to the Ukrainian State Center for International Education, as of the beginning of 2021, 76548 foreign students, graduate students, doctoral students, and students from 155 countries were studying in Ukraine. Over the past ten years, there has been a positive trend in the internationalization of higher education, as the total number of foreign students has almost doubled (from 38,166 people in 2011 to 67,327 people in 2020, there was a slight decrease in the total number of foreign students from 80,470 people). 2019 to 76548 people in 2020 in connection with the global coronavirus pandemic) (table 5) (State Statistics Committee of Ukraine, 2023).

As of the beginning of 2021, out of the total number of foreign students staying in Ukraine, 90.02% came for basic education, 6.45% – for language training, 2.25% – for continuing postgraduate education, 1.27% – postgraduate and doctoral studies, 0.01% – in academic mobility programs.

The leading donor countries for Ukraine are India (23.64% of the total number of foreign students), Morocco (11.54%), Azerbaijan (6.95%), Turkmenistan (6.05%), Nigeria (5.52%), China (5.30%), Turkey (5.22%), Egypt (3.98%), Israel (2.75%), Uzbekistan (2.07%) and others (Ukrainian State Center for International Education, 2021).

With the growing demand for education export services, the supply is growing – the number of higher education institutions accepting foreign students has increased from 185 institutions in 2015 to 394 in 2020. The highest figure was in 2019 and amounted to 455 universities (table 5). The decrease in the number of institutions that provide training to foreigners is due to objective reasons – the reduction in the number of institutions of I-II level of accreditation in the country.

The most popular among students from other countries are Kharkiv National University named after V. Karazin, where 4277 foreigners study, Kharkiv National Medical University (4215), National Medical University named after O. Bogomolets (3061), Odessa National Medical University (2935), Zaporizhzhya State Medical University (2860), Vinnytsia National Medical University named after M. Pirogov (2771), Dnipro State Medical University (2573), Ternopil National Medical University named after I. Gorbachevsky (2433), Bukovynian State Medical University (2095), T. Shevchenko National University of Kyiv (1838) (Ukrainian State Center for International Education, 2021).

Usually, international students choose those specialties that are in demand in the country of their citizenship. Thus, in 2020, among a number of others, such areas of training were popular as medicine, which was chosen for admission by 32.36% of foreign students, medical – 7.72%, dentistry – 6.33%, man-

Table 4: Inbound students by academic level 2019, % of the total number of foreign citizens studying abroad in the country.

Academic level / Country	United States	UK	Australia	Russia	Germany	Poland
Undergraduate degree/ Qualification	55.3	51.4	46.3	60.3	40.9	76.2
(Post-)Graduate degree/Qualification	46.7	40.8	48.6	29.9	59.1	23.8
Undergraduate study abroad/Non-award	-	7.2	5.1	3.2	-	-
(Post-)Graduate study abroad/ Non-award	-	0.6	-	6.6	-	-

Table 5: Characteristics of higher education institutions in Ukraine 2010-2021.

Year	Number of higher education institutions	Number of higher education institutions accepting foreigners	Number of students, million people	Number of foreign students, people	Number of students, trainees, doctoral students, people
2010-2011	813	-	2.418	38166	53664
2014-2015	664	-	1.689	56933	63172
2015-2016	659	185	1.605	53493	63906
2016-2017	657	228	1.587	52147	64066
2017-2018	661	239	1.539	48991	66310
2018-2019	652	443	1.522	54556	75605
2019-2020	619	455	1.440	60006	80470
2020-2021	515	394	1.442	67327	76548

agement – 4.36%, pharmacy – 3.10%, law – 2.97%, architecture and construction – 2.96%, secondary education – 2.27%, finance – 1.95%, economics – 1.60%, philology – 1.29% and others (Shapovalova, 2020). Educational programs for the training of medical workers are most in demand among students from India, Morocco, China and Asia. Students from post-Soviet countries choose to study such specialties as law, economics, international relations, banking, public administration, etc. The largest number of foreign students mastering the educational programs "Secondary Education", "Philology" came to Ukraine from China (Shapovalova, 2020).

Another positive point that attracts foreign students to Ukraine is the cost of education. According to the Ministry of Education and Science of Ukraine, the average tuition fee for medical students is 4.3 thousand dollars a year, and for other specialties – 2 thousand dollars (Ministry of Education and Science of Ukraine, 2020), which is almost 10 times less than in Western Europe or 5 times less than in Turkey or China. Nevertheless, the competition for foreigners to enter Ukrainian higher education institutions is almost non-existent, and accordingly the chances of obtaining a diploma are much higher than in the countries of origin.

Spivakovska and Hnativska (2010) conducting a comparative analysis of higher education institutions in Ukraine and other countries, systematized the advantages and disadvantages of Ukrainian universities given their attractiveness to foreign students, presenting the results in the form of a table (table 6, 7). According to these authors, given the differences in higher education, Ukraine as an exporter of educational services can focus on the target audience of students from the Middle East, Southeast and Central Asia, as well as post-Soviet countries.

In our opinion, the list of these differences is incomplete and needs to be supplemented.

6 SURVEY RESULTS OF FOREIGN STUDENTS STUDYING IN UKRAINE

In order to describe the situation on the Ukrainian market of educational services and to clarify the level of competitiveness during July-August 2020, the State Enterprise "Ukrainian State Center for International Education" and Kharkiv National Economic University named after S. Kuznets conducted a survey among students with the assistance of the Ministry of Education and Science of Ukraine – foreigners studying in various educational institutions of Ukraine (sample size – 451 people). The survey was conducted using the questionnaire method.

The responses of foreign students confirmed the assumptions about the existing advantages of Ukraine compared to competing countries in the market of educational services. After all, the leading factors of choice in favor of Ukrainian higher education institu-

Table 6: The results of a comparative analysis of the peculiarities of the functioning of higher education institutions (Ukraine compared to the EU, the Middle East, Asia and Africa).

Advantages	Disadvantages
1) lower price for education and accommodation 2) availability of material and technical base for conducting laboratory and practical classes	1) poor living conditions in dormitories 2) outdated equipment in laboratories for practical training 3) lack of teaching in German, French Arabic, Turkish and other languages (with some exceptions) 4) limited budget places for foreign students

Table 7: The results of a comparative analysis of the peculiarities of the functioning of higher education institutions (Ukraine in comparison with the countries of the post-Soviet space).

Advantages	Disadvantages
1) lower price for education and accommodation compared to Russia 2) loyal attitude to representatives different nationalities, religious beliefs 3) higher level of education quality	1) higher tuition fees compared to Belarus, Georgia, Moldova, Turkmenistan and others

tions for the majority of surveyed students were the reasonable cost of education (44.1%), political and geographical location of Ukraine (41.7%) (table 8) (Ukrainian State Center for International Education, 2020).

Table 8: Distribution of respondents' answers to the question "Why did you choose to study in Ukraine?", % of the total number of respondents, multiple choice.

Answer options	%
Quality of education	36.8
Cost of education	44.1
Recognition of the diploma in the homeland	34.8
I wanted to study in Europe	41.7
Opportunity to gain practical experience	27.0
Other reasons	11.3

The hypothesis about the complexity of paperwork was also confirmed, as almost a third of respondents (27.4%) had some difficulty in obtaining a study visa. According to the respondents, the time spent on obtaining permits averaged from 1 to 3 months (table 9), and had to pay about 500-1000$ and more (table 10) (Ukrainian State Center for International Education, 2020).

The third hypothesis about the difficulties of exporting educational services due to the lack of information, marketing and advertising support for recruitment, the lack of a network of university agents, was also confirmed. After all, the majority of respondents processed documents through intermediaries – private

Table 9: Distribution of respondents' answers to the question "How much time did you spend preparing documents for admission (receiving an invitation, legalizing documents, translation, obtaining a study visa)?", % of the total number of respondents.

Answer options	%
Less than 1 month	23.6
From 1 to 3 months	60.7
More than 3 months	15.7

Table 10: Distribution of respondents' answers to the question "How much money did you spend on preparing documents for admission (receiving an invitation, legalization of documents, translation, obtaining a study visa?)", % of the total number of respondents.

Answer options	%
Up to 100$	3.5
100-300$	12.8
300-500$	111.6
500-1,000$	28.2
More than 1,000$	43.9

recruitment companies (table 11), which in their activities do not always meet the requirements of integrity. In addition, the involvement of third parties significantly delays the processing of documents and increases the cost of this procedure (Ukrainian State Center for International Education, 2020).

As practice shows, when it comes to the intentions of foreign students to study abroad, along with such factors as the quality of educational services, career opportunities, adaptation and the formation of a sense

Table 11: Distribution of respondents' answers to the question "How did you apply for an invitation to study?", % of the total number of respondents.

Answer options	%
Personally in Ukraine	16.6
Through the website of the Ukrainian State Center for International Education	1.1
Sent to the university by mail in person	4.1
Sent online to university	5.2
Through a private recruitment company	73.0

of belonging are especially important. That is why the development of social support networks is relevant, which at the stage of recruitment contribute to the formation of a positive social microclimate. Therefore, it is advisable to intensify the work of universities in this direction, in particular by creating appropriate services on the official websites of higher education institutions on the Internet, groups on social networks, the organization of national and international educational fairs and more.

The average score of satisfaction of foreign students with studies at Ukrainian universities is 6.3 points (where 1 point – completely dissatisfied, 10 points – completely satisfied) (table 12) (Ukrainian State Center for International Education, 2020). The average score was calculated as the arithmetic mean of all data given by respondents.

Table 12: Distribution of respondents' answers to the question "Are you satisfied with your studies at the university (where 1 point – completely dissatisfied, 10 points – completely satisfied)?", % of the total number of respondents.

Answer options	%
1	8.0
2	4.0
3	5.0
4	5.0
5	12.0
6	10.0
7	20.0
8	12.0
9	7.0
10	17.0

Table 13: Distribution of respondents' answers to the question "What language is taught in?", % of the total number of respondents.

Answer options	%
In English	56.0
Mixed form of teaching	18.0
In Russian	16.1
In Ukrainian	9.9

Table 14: Distribution of respondents' answers to the question "In what language would you like to study?", % of the total number of respondents.

Answer options	%
In English	58.9
In Russian	25.6
In Ukrainian	8.8
In French	4.3
In German	2.0
In another language	0.4

Table 15: Distribution of respondents' answers to the question "What would you like to improve in the system of education of foreigners in Ukraine?", % of the total number of respondents, multiple choice.

Answer options	%
Material and technical base of the university	47.0
International community	44.0
University infrastructure	37.0
Dormitories	50.4
Opportunities for leisure	37.6
Nothing, everything is satisfying	17.2

Students have a number of reasons for dissatisfaction with their studies in Ukraine. It is, first of all, about the language of instruction. Despite the fact that in the vast majority of educational institutions teaching is in English (table 13), students seek to study in their native language (table 14) (Ukrainian State Center for International Education, 2020). Every fourth student surveyed wants to study in Ukrainian universities in Russian, first of all, they are from the post-Soviet countries. However, the issue of language is particularly acute for Ukraine, especially given the military conflict with Russia, so meeting this requirement is extremely problematic, at least for now.

Almost half of the respondents are dissatisfied with the state of living in dormitories, logistics of universities (table 15) (Ukrainian State Center for International Education, 2020).

7 IMPLICATIONS AND CONCLUSION

At the beginning of the XXI century, competition among education-exporting countries has received a new impetus due to the adoption by most Western European countries of an action program to expand foreign policy, including export-import policy in the field of educational services. Such interest in the development of this market segment is determined by a number of reasons: the available economic benefits

(payment for tuition, accommodation, meals, transport, entertainment, etc.); the possibility of modernizing national markets for educational services to increase competitiveness; intensification of the expansion of international cooperation in the field of science and technology, language, values and culture, as well as the need to form a positive image of the country in the world community.

The field of education is developing dynamically, trying to meet all the demands of scientific and technological progress in the field of material production, the deepening of the international division of labor and the growth of socio-economic needs of mankind. Analysis of its functioning allows us to draw certain conclusions that the modern international market of educational services is characterized by trends of internationalization and development of cross-border education, large-scale academic mobility of students and teachers, development of new strategies for exporting educational services in a pandemic, creation and development of network structures of providers, transition from mass enrollment of students to search of the most talented.

Ukraine is not yet able to fully compete with the leaders in the ranking of countries exporting educational services. However, today it is steadily embracing its niche among them, owning about 1.0% of the international market. Ukrainian higher education institutions have the potential to increase exports of educational services, primarily by increasing the share of gross value added in higher education as one of the leading sectors of the national economy.

To identify the problems that exist in the provision of educational services, as well as the reasons hindering its development, the method of critical analysis and analysis of expert opinions was used. These methods made it possible to supplement the list of differences of functioning of higher education institutions in Ukraine and other countries. Thus, the advantages of Ukraine include the convenience of political and geographical location, the availability of extensive transport infrastructure, high security of residence, convertibility of Ukrainian diplomas of higher education abroad, highly qualified teachers, a variety of educational programs and more. No less important is the international context of Ukrainian legislation in the field of education, which is loyal to both foreigners and refugees. There is also an official information resource in Ukraine – the Ukrainian State Center for International Education, which is a state source of information on the export of educational services.

Among the shortcomings, compared to the closest competitor – Russia, Ukraine still has a fairly strict system of legalization of documents (a paid procedure for affixing an apostille on official documents is mandatory). Another weakness of Ukraine is the lack of a network of university agents, and thus the ineffectiveness of individual information campaigns to attract foreign students, both at the national and regional levels. Given the popularity of medical education programs, emphasis should be placed on the need to address internship education and appropriate practical training.

As for the quota of budget places for foreign students, it applies only to persons coming to study in Ukraine in accordance with international agreements on cooperation, as well as foreign Ukrainians. Accordingly, the expansion of quotas would further motivate non-residents to study at Ukrainian universities.

A significant disadvantage is the lack of complete information about educational programs and the list of disciplines, because not all official university websites present them in English. In addition, if a foreign student wishes to transfer to further education in a particular educational program, there is a problem of compliance with the content of the programs of the same name, as well as the question of making an academic difference.

If most of these shortcomings of the international direction of the Ukrainian segment of higher education are eliminated, our country will be able to significantly increase competitiveness in the global market of educational services.

Analysis of statistical data and systematization of the results of empirical sociological research led to the conclusion that over the past five years, the competitiveness of the Ukrainian higher education system has slightly increased. As we can see, despite the positive changes taking place in Ukrainian higher education today, in particular in the international direction, a number of key issues remain unresolved, which significantly affect its competitiveness in the market of educational services.

The use of forecasting and scenario planning methods made it possible to determine the main trends in the development of the national higher education market. In particular, the first step in this direction is to change the priorities of Ukrainian educational policy in order to increase the competitiveness of national universities. In particular, the Ministry of Education and Science of Ukraine approved a plan of measures to promote national higher education institutions in the global market of educational services, which provides for the establishment of an association of foreign graduates, improving the legal framework, creating an interagency electronic platform, intensifying international cooperation with partner universities. etc. (Ministry of Education and Science of

Ukraine, 2021).

The study, conducted by the authors before the recent full-scale invasion of Russia on February 24, 2022 on the territory of Ukraine, included the study of the state and problems of the functioning of the national segment of higher education, which provides services for foreign students. The outlined prospects for the internationalization of Ukrainian higher education were possible in peacetime. A number of higher education institutions and foreign students are already known to have been affected by the war, which should not be ignored, and perhaps even identified as a direction for future research. In the near future, Ukraine's position in the international market will be shaken, since even today the landscape of Ukrainian higher education and its opportunities have changed significantly. The decrease in the influx of foreign students will depend on the duration of hostilities, the possibility of ensuring their safe stay in Ukrainian institutions of higher education. A priority for development and a topic for further research may be the distance education of foreign students in Ukrainian universities, who work today in exile.

With the start of a full-scale war in February 2022, all foreign students left the territory of Ukraine and continued their studies remotely. Some students, due to the inability to continue their studies in their own country or transfer to another university, returned to Ukraine to complete their course of study, despite the dangers of wartime. How events will develop in the future depends, first of all, on the duration of hostilities on the territory of Ukraine. The main problems of organizing the education of foreign students today are security, communication in the face of power outages and the Internet.

REFERENCES

Abuselidze, G. and Zoidze, G. (2023). The use of transferable skills in education and its impact on the economy. *CTE Workshop Proceedings*, 10:124–138. https://doi.org/10.55056/cte.550.

Altbach, P. (2003). The Costs and Benefits of World-Class Universities. *International Higher Education*, (33):5–8. https://doi.org/10.6017/ihe.2003.33.7381.

Ammigan, R. (2020). The International Student Experience: A Data-driven Approach to Enhancing StudentSatisfaction at Institutions of Higher Education. In Özkan, A. D., editor, *Selected proceedings of Eurasia Higher Education Summit EURIE 2020*, pages 101–106. İstanbul Aydın University, Istanbul. https://www.researchgate.net/publication/349737165.

Aydrus, I. A. and Filippov, V. M. (2008). *World market of educational services*. Peoples' Friendship University of Russia, Moscow. https://repository.rudn.ru/ru/records/manual/downloadfile/212a621d-e7a2-e911-80c8-30e1715d1da7/.

Horta, H. (2009). Global and national prominent universities: internationalization, competitiveness and the role of the State. *Higher Education*, 58(3):387–405. https://www.jstor.org/stable/40269190.

Hou, Y.-W. and Jacob, W. J. (2017). What contributes more to the ranking of higher education institutions? A comparison of three world university rankings. *International Education Journal: Comparative Perspectives*, 16(4):29–46. https://openjournals.library.sydney.edu.au/index.php/IEJ/article/view/10638.

Institute of International Education (2019). Project Atlas 2019 release: A quick look at Global Mobility Trends. https://www.iie.org/en/Research-and-Insights/Project-Atlas/Explore-Data/Infographics/2019-Project-Atlas-Infographics.

Institute of International Education (2020). Project Atlas 2020 release: A quick look at Global Mobility Trends. https://iie.widen.net/s/rfw2c7rrbd/project-atlas-infographics-2020.

Khomeriki, E. A. (2015). Ukrainian higher education in the format of Bologna process: trends and issues. *Scientific and Theoretical Almanac Grani*, 18(7):6–10. https://doi.org/10.15421/1715127.

Knight, J. (2004). Internationalization Remodeled: Definition, Approaches, and Rationales. *Journal of Studies in International Education*, 8(1):5–31. https://doi.org/10.1177/1028315303260832.

Larionova, M. V. (2012). Methodology for comparative analysis of international approaches to ranking higher educational institutions. *Bulletin of international organizations: education, science, new economy*, (1(36)):34–69.

Levchenko, O. and Tsarenko, I. (2016). The competitiveness of higher education of Ukraine in dimension of international rankings. *Economics and organization of management*, (3(23)):73–81. https://jeou.donnu.edu.ua/article/view/2874.

Levchenko, O. M. and Plynokos, D. D. (2015). Exports of Educational Services at Higher Educational Institutions of Ukraine in Terms of Globalization Processes. *Ekonomika: realii chasu*, (4(20)):210–216. https://economics.net.ua/files/archive/2015/No4/210-216.pdf.

Lombardi, J. V., Craig, D. D., Capaldi, E. D., Gater, D. S., and Mendonça, S. L. (2001). Quality Engines: The Competitive Context for Research Universities. An Annual Report from The Lombardi Program on Measuring University Performance. http://tinyurl.com/mr549s48.

Londar, S., Shapovalova, O., and Pron, N. (2020). Market of educational services in ukraine: competitive advantages and modern challenges for foreign students. *Educational analytics of Ukraine*, (1(8)):5–22. https://doi.org/10.32987/2617-8532-2020-1-5-22.

Ministry of Education and Science of Ukraine (2020). Dokhid Ukrainy vid inozemnykh studentiv za period yikh navchannia stanovyt ponad 3 miliardy dolariv SShA – Ukrainskyi derzhavnyi tsentr mizhnarodnoi

osvity [Ukraine's income from foreign students during their studies is more than 3 billion US dollars – Ukrainian State Center for International Education]. http://tinyurl.com/394uhkmj.

Ministry of Education and Science of Ukraine (2021). Populiaryzatsiia vyshchoi osvity Ukrainy na svitovomu rynku osvitnikh posluh – Uriad zatverdyv plan zakhodiv [Promotion of higher education in Ukraine on the world market of educational services – the government has approved an action plan]. http://tinyurl.com/4wuca9th.

Pavlenko, A. F. and Antonyuk, L. L., editors (2014). *Research universities: world experience and prospects for development in Ukraine*. Kyiv National Economic University named after Vadym Hetman; Institute of Higher Education, Kyiv. https://ir.kneu.edu.ua/bitstream/handle/2010/7906/cgiirbis_64.pdf?sequence=1&isAllowed=y.

Rayevnyeva, O. V., Malyshko, Y. O., Brovko, O. I., and Chernyshov, V. V. (2020). The Factors of Competitiveness of the Higher Education Institutions of Ukraine. *Business Inform*, (12):109–116. https://doi.org/10.32983/2222-4459-2020-12-109-116.

Savytska, N. L., Ushakova, N. G., and Pominova, I. I. (2016). The Market for Higher Education Services in the Context of the Theory of Merit Goods. *Problemy ekonomiky*, (4):190–196. https://www.problecon.com/export_pdf/problems-of-economy-2016-4_0-pages-190_196.pdf.

Shapovalova, O. O. (2020). *Inozemni studenty v Ukraini: statystychni dani [Foreign students in Ukraine: statistics]*. Ukrainian State Center for International Education, Kyiv. https://iraq.mfa.gov.ua/storage/app/sites/36/uploaded-files/student2020.pdf.

Spivakovska, T. V. and Hnativska, D. P. (2010). Mozhlyvosti vykhodu ukrainskykh vyshchykh navchalnykh zakladiv na mizhnarodnyi rynok osvitnikh posluh [Opportunities for Ukrainian higher education institutions to enter the international market of educational services]. *Economic Bulletin of the National Technical University of Ukraine Kyiv Polytechnic Institute named after Igor Sikorsky*, (7):79–86.

State Statistics Committee of Ukraine (2023). Demographic and social statistics / Education. https://www.ukrstat.gov.ua/operativ/menu/menu_u/osv_.htm.

Stepanenko, I. and Debych, M. (2017). Navchannia inozemnykh studentiv v Ukraini: stan problemy, perspektyvy [Education of foreign students in Ukraine: the state of the problem, prospects]. *Vyshcha osvita Ukrainy*, (4):48–55. http://nbuv.gov.ua/UJRN/vou_2017_4_8.

Times Higher Education (2020). World University Rankings 2020. https://www.timeshighereducation.com/world-university-rankings/2020/world-ranking.

Ukrainian State Center for International Education (2020). Prezentatsiia zvitu za rezultatamy marketynhovoho doslidzhennia pryvablyvosti ukrainskoi vyshchoi osvity dlia inozemnykh hromadian [Report on the results of a marketing study of the attractiveness of Ukrainian higher education for foreign citizens]. http://tinyurl.com/26fhu9dd.

Ukrainian State Center for International Education (2021). Foreign students in Ukraine: statistics. http://web.archive.org/web/20230422174119/https://studyinukraine.gov.ua/zhittya-v-ukraini/inozemni-studenti-v-ukraini/.

Varghese, N. V. (2008). Globalization of higher education and cross-border student mobility. IIEP Research paper, Paris. https://unesdoc.unesco.org/ark:/48223/pf0000157989/PDF/157989eng.pdf.multi.

Verkhovna Rada of Ukraine (2022). Pro skhvalennia Stratehii rozvytku vyshchoi osvity v Ukraini na 2022-2032 roky [On the approval of the Strategy for the Development of Higher Education in Ukraine for 2022-2032]. https://zakon.rada.gov.ua/laws/show/286-2022-%D1%80.

Williams, R. and Leahy, A. (2020). *U21 Ranking of National Higher Education Systems*. The University of Melbourne, Melbourne. https://universitas21.com/sites/default/files/2020-04/U21_Rankings%20Report_0320_Final_LR%20Single.pdf.

English Teaching and Learning Strategies and Tactics for Tertiary Education

Alona Litvinchuk[1][a] and Larysa Kupchyk[1][b]
[1]*National University of Water and Environmental Engineering, 11 Soborna Str., Rivne, 33028, Ukraine*
{*a.t.litvinchuk, l.y.kupchyk*}*@nuwm.edu.ua*

Keywords: English Language Acquisition, Tertiary Education, Motivational Construct, Learning Experience, Differentiated Instruction, Language Learning Strategy.

Abstract: This paper provides an in-depth examination of the interplay between motivational constructs, differentiated instruction, and language learning strategies development in a systemic view on the efficiency of English language acquisition by non-language students at tertiary level. These three components are viewed as guidelines for developing teaching strategies and tactics when delivering the EFL university course and generating sustained motivation for autonomous learning. The paper explores the L2 motivational theories and determines the constructs contributing to achieving success in language learning, i.e integrative and achievement motives, positive attitudes, learning context and learning experiences. Differentiated instruction is regarded as a powerful pedagogical approach that can offer homogeneous learning environment based on expanding motivational constructs, tailoring instruction to meet diverse learning needs and abilities, and creating supportive atmosphere that fosters integrative motivation. Language learning strategies are explored as integral to the course content, the process of acquiring English language skills, enhancing motivation and enabling self-regulated or self-directed learning. The theoretical exploration of each component concludes with practical recommendations.

1 INTRODUCTION

The English language has long been considered a global *lingua franca* connecting people from diverse linguistic, academic, and professional backgrounds across the world. In modern Ukraine's context with its even more growing integration into the global community and development of new national language policies, the demand for effective teaching and learning strategies in English language acquisition (ELA) has significantly increased, particularly in non-language higher education settings. On June 28, the draft law "On the Use of English in Ukraine" was registered in Ukraine's Parliament (No. 9432 of June 28, 2023) that envisages the official consolidation of the status of English as the language of international communication and defines the categories of positions which can be held by the candidates with the obligatory knowledge of English. This fact even makes a stronger contribution to the necessity of developing a comprehensive system of English language education for tertiary non-language students. It has the University course of "English as a Foreign Language" (EFL) at its core and is expected to grow into a continuous process of improving English language skills. It can be done through using either electives, training different aspects of the English language, or taking courses and participating in programmes based on using English as a Medium of Instruction (EMI) catering to the specific needs of students in disciplines outside the language studies. Such strategic approaches aligned with their consolidated vision of being competency-based and student-centred are now increasingly regarded as such requiring motivating learning environment, flexible learning paths, personalised learning, diversity of instruction delivery modes, technology enhancement, and increasing role of self-regulated, self-directed or autonomous learning that is the key to realising the concept of Life Long Learning (LLL) as a skill or mission of the 21st century. As it is claimed by UNESCO, "universities of applied sciences, polytechnics and technical institutes, play a crucial role in providing LLL opportunities" within the context of knowledge society that demands continuing professional development (UNESCO Institute for Lifelong Learning, 2022, p. 78).

[a] https://orcid.org/0000-0002-0794-5379
[b] https://orcid.org/0000-0002-3522-7673

Litvinchuk, A. and Kupchyk, L.
English Teaching and Learning Strategies and Tactics for Tertiary Education.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 85-97
ISBN: 978-989-758-579-1

Common challenges faced by the second language learners in non-language institutions of higher education arise due to usually insufficient quantity of practical hours or "not much space to learn foreign languages as part of the subject curriculum" (Lai et al., 2022); lack of persistence and continuity in foreign language learning (Davis, 2020); psychological challenges, low self-esteem and demotivation (Zaytseva et al., 2021); uneven English proficiency entry level (from sometimes elementary to more frequently pre-intermediate and, in rare cases, advanced level) that leads to distinct academic group's heterogeneity (Kupchyk and Litvinchuk, 2020; Jørgensen and Brogaard, 2021); often low self-regulation abilities in foreign language acquisition (Przybył and Chudak, 2019), which have become especially evident during distance learning. In addition, the situation in Ukraine is exacerbated by the ongoing full-scale Russian invasion that in many cases demands mixed-mode learning, unexpected interruptions in delivering in-class training, more pedagogical and psychological support. Such challenges require exploring effective approaches to address these obstacles and discussing teaching strategies and tactics to support learners with varying language backgrounds, proficiency levels, and academic goals.

Among the most powerful instruments that really matter in studying a foreign language are claimed to be motivation, differentiation and strategic language learning behaviour (Sapan and Mede, 2022). Motivation and its constructs are regarded as key factors determining students' success or failure and their rate of progress in any learning situation (Al-Hoorie and MacIntyre, 2019). Dörnyei and Ushioda (2011), even arguing the complexity and inability of motivation to become a "super-theory" in foreign language acquisition, provide some practical implications of motivation theory for the language classroom with special emphasis on motivational teaching strategies, the value of cooperative learning and contextual influences (Dörnyei and Ushioda, 2011), which are still under consideration and constant adjustment or further development. To sustain language learning motivation "through the vicissitudes of the learning process", there is a need to develop certain skills and strategies to "keep the learners on track" (Griffiths, 2008). Development and employment of appropriate language learning strategies, as such implying and embracing the conscious actions and behaviours used by language learners to foster and continuously support the acquisition of the English language, are in the focus of current methodological research with particular reference to self-directed language learning (Lai et al., 2022) or self-regulated learning (Oxford, 2016), distance education (Neroni et al., 2019), and technology-enhanced language learning (Lai et al., 2022; Bećirović et al., 2021). This scope can be completed with differentiation as a pedagogical approach that enables adjusting instruction to address varying students' needs and abilities. It was pioneered by Tomlinson (2001) and Gregory and Chapman (2013), and is still on the agenda regarding the theory and practice of personalising student language learning paths (Kupchyk and Litvinchuk, 2020; Jørgensen and Brogaard, 2021).

Thus, this paper aims to contribute to methodological considerations and highlight the key provisions to effective English language education through creating opportunity for developing sustained motivation in ELA; designing the EFL university course on the basis of differentiated instruction to tailor training content for different learners; developing in students the relevant language learning strategies as powerful tools to help learners be more independent and autonomous that contribute either directly or indirectly to gaining positive learning experiences, boosting their self-confidence and progress.

2 BACKGROUND

The research into the theory of language learning motivation, launched by Gardner and Lambert in 1959, gave rise to numerous studies recognising that attitude and motivation matter in second language acquisition alongside aptitude and intelligence "as factors contributing to language learning success" (MacIntyre, 2010), and it continues to inspire further studies into this issue. Dörnyei and Ushioda (2011), when contemplating on the complexity of motivation, agree that it is responsible for "why people decide to do something, how long they are willing to sustain the activity and how hard they are going to pursue it" (Dörnyei and Ushioda, 2011, p. 4). They also consider the importance of social context and study the way in which changing contextual perspectives reshape motivation theory in L2 learning (Dörnyei and Ushioda, 2011).

As it is claimed by Dörnyei (2005), since "motivation is a dynamic, ever-changing process, its research should also evolve over time" (Dörnyei, 2005, p. 66). When exploring the central motivational constructs, researchers distinguish achievement motives, achievement goals and achievement values, self-efficacy, positive competence beliefs, developing feeling of autonomy and relatedness (Elliot et al., 2017). Viewing contextual and dynamic aspects of learner motivation, Dörnyei and Ushioda (2011) also

developed the L2 Motivational Self System, which among other constructs, embraces L2 learning experience described as long-term, when affected by social and cultural influences, and short-term, when influenced "by specific features of the instructional context" (e.g. course content, task and material design, grouping structures and evaluation practices) (Dörnyei and Ushioda, 2011). It is supported by other research in which motivating instructional context along with L2 teacher, the curriculum, the peer group, and experiencing success in language learning are described as executive motives in creating motivating learning environment (Dörnyei and Ryan, 2015). Deci and Ryan (2015) come up with self-determination theory (SDT) focusing on human three basic psychological needs: the needs for competence, autonomy, and relatedness either driven or prevented by social and contextual conditions (Deci and Ryan, 2015). Other researchers focus on general implications of SDT for formalised learning education and identify how self-determined motivation develops in different contexts (Brenner, 2022; McEown and Oga-Baldwin, 2019).

University language education settings and options can create the basis for generating and sustaining motivation in students throughout their studies. It demands considering the conditions and integrating the motivational constructs to create positive learning environment taking into account student's expectancy, values and attitudes, creating the sense of achievement on the one hand, and adjusting the instructional context on the other. These conditions are aligned with differentiation or differentiated instruction (DI) as an approach appealing to each student's language learning ability and described as "a philosophy that enables teachers to plan strategically in order to reach the needs of the diverse learners in classrooms" (Gregory and Chapman, 2013). The need for differentiated instructional planning is emphasised by Tomlinson (2017), who explores the role of the teacher in the differentiated classroom, creation of appropriate learning environment when differentiating content, process, and products, and application of the relevant strategies and tactics (Tomlinson, 2017). The proponents of this philosophy place emphasis on DI as a possibility to "develop learning routes for each student based on insights into their abilities and leaning needs" (de Graaf et al., 2019), and a necessity to make ongoing choices based on a range of well-considered students' goals and needs (van Geel et al., 2019, p. 62).

Creating the necessary motivating learning environment based on differentiation will not be complete without discussing language learning strategies (LLSs) as powerful tools for training competent and effective language learners. The studies of LLSs dated back to the 1970s being pioneered by Rubin (1987) in order to identify good learner behaviour. Since then, they have been under the researchers' focus to classify them (Rubin, 1987; Oxford, 1990; O'Malley and Chamot, 1990; Stern, 1992) and to develop questionnaires in order to assess students' use of strategies (Oxford, 1990). LLSs are viewed as a useful mechanism to succeed in both self-directed (Lai et al., 2022) and self-regulated learning (An et al., 2021; Redmer, 2022). However, it is necessary to give LLSs due consideration since they should not be perceived as a comprehensive solution in handling all language learning problems and are likely to be heavily affected by learner's changing behaviour, techniques and technology used. Thus, current insights into this domain are mostly related to developing tech-enhanced LLSs for learning effectiveness (An et al., 2021; Zhou and Wei, 2018), to the effectiveness of mobile learning in developing LLSs (Garzón et al., 2023; Lai et al., 2022), as well as to applying learning technologies in fostering language learning skills in order to become strategic and autonomous language learners (Sanchez and Lidawan, 2020).

3 THE IMPACT OF MOTIVATIONAL CONSTRUCTS ON TEACHING AND LEARNING STRATEGIES AND TACTICS

Motivation has been widely recognised "as a significant factor influencing the success or failure in second or foreign language learning" and it encourages significant attention from researchers in delving into this issue (Yue et al., 2022). It is considered to provide "the primary impetus to initiate L2 learning and later the driving force to sustain the long, often tedious learning process", and is claimed to make up possible deficiencies in language learning ability and learning context (Dörnyei and Ryan, 2015). The fundamental research into language learning motivation theory started with Gardner's theory distinguishing between integrative and instrumental motivation (Gardner, 1985). Integrative motivation or orientation in Gardner's theory, which stems from personal interest and enjoyment, is regarded as a potential factor in sustaining students' engagement and commitment to language learning. When students have a genuine desire to learn a language, they are more likely to persevere

through difficulties and stay motivated over time. Instrumental motivation in students arises from external factors such as academic achievement, i.e receiving grades or certificates, gaining career opportunities, or simply satisfying social expectations that can provide additional incentives and reinforce students' commitment (Lamb et al., 2020).

One of the most influential embodiment of Gardner's theory is socio-educational model, which schematically outlines how motivation is related to other individual variables like intelligence, language learning ability, and language achievement (Dörnyei, 2005). It has the integrative motive at its centrepiece which describes a person's eagerness and inclination for engaging in social interactions with individuals from different groups. The integrative motive pertains specifically to language learning, highlights the social and cultural dimensions of language learning. By recognising and supporting students' desire to integrate with a new culture or community, teachers can tap into this powerful motivational construct and create meaningful language learning experiences that go beyond linguistic proficiency (Dörnyei and Ushioda, 2011). However, integrative motive by itself does not account for the learner's degree of success, but rather is embodied in a "continuous interplay between the characteristics of the integrative motive and the language learning process itself" (Lamb et al., 2020). Among other components of this model are such motivational constructs as effort, desire, and attitude toward learning on the one hand, and attitude toward the learning situation or context comprising evaluation of the L2 teacher and the L2 course on the other (Eraldemir Tuyan and Serindağ, 2019). In the context of our research, these constructs become guidelines in developing the strategies and tactics of ELA. In educational settings, fostering the integrative motive involves creating opportunities for students to connect with the target language community, promoting intercultural competence, and encouraging positive attitude towards cultural diversity. Teachers can incorporate authentic materials, cultural discussions, and collaborative activities that foster cross-cultural understanding and interaction. It is also recommended to encourage students to participate in academic exchange programmes or to assign students various personal and group projects to investigate different issues of English-speaking countries and societies aimed at developing their positive attitudes (Eraldemir Tuyan and Serindağ, 2019), along with sense of belonging to the global society.

Another decisive construct in the motivational system is claimed to be the achievement situation that comprises achievement motive, achievement goal, and achievement values "promoting more positive regulatory processes" (Elliot et al., 2017, p. 47). Achievement motive refers to the learner's internal drive or desire to attain and excel in their language learning endeavours with such indicators "as measures of proficiency, classroom behaviour, participation in bicultural excursions" (Lamb et al., 2020). Achievement goals can determine specific objectives that students set for themselves in their language learning journey. Achievement values may refer to the personal beliefs, attitudes, and priorities associated with language learning. They are interconnected factors that influence students' motivation and engagement in ELA. They are also claimed to indicate "a concern with success in competition with some standard of excellence", as well as they influence and positively correlate with language learning strategies (Han and Lu, 2018). Understanding and addressing these aspects can contribute to a supportive and purposeful learning environment, enhance students' motivation and nurture their sense of accomplishment and fulfilment.

Further considerations of the issue of motivation lead to developing the L2 Motivational Self System (Dörnyei and Ushioda, 2011), one of the components of which is the L2 learning experience that "focuses on the learner's present experience, covering a range of situated, 'executive' motives related to the immediate learning environment (e.g., the impact of the L2 teacher, the curriculum, the peer group, and the experience of success)" (Dörnyei and Al-Hoorie, 2017). It suggests that this experience encompasses various situated motives related to the immediate learning environment that can impact students' motivation, engagement, and overall language acquisition. For example, L2 teaching methods, approachability, and supportiveness can significantly influence students' attitude towards learning and their motivation to succeed. It is implemented through the curriculum design, materials, employed instructional strategies and tactics that can shape students' experience and determine their level of engagement. The phrase "situated 'executive' motive" suggests that the students' motives are context-dependent and influenced by specific factors in the learning environment, e.g. interactions with the teacher or peers, the feeling of progressing and achieving success (Dörnyei and Al-Hoorie, 2017). In addition, positive experiences of success, recognition, or positive feedback are believed to enhance motivation and reinforce the students' desire to continue learning and improving in L2 (Han and Lu, 2018).

When discussing strategies and approaches of language learning motivation in practice, Dörnyei and

Ushioda (2011) focus on creating positive attitudes and learning context through increasing students' self-confidence by five approaches:

- fostering students' belief in changeability and controllability of competence as an aspect of development;
- promoting favourable self-conceptions of L2 competence through success experiences and focusing on abilities;
- engaging hard-to-reach students by making them feel important, allowing them to contribute, and demonstrating positive qualities;
- praising and encouraging every student's effort, reducing classroom anxiety by creating a less stressful learning environment, and equipping students with coping strategies.

The research into confidence-competence development and reducing anxiety laid the foundation for elaborating Self-Determination Theory (SDT) by Deci and Ryan (2015), which is called a theory of human motivation and well-being aimed at explaining how and why sustainable motivation occurs (McEown and Oga-Baldwin, 2019). As it is claimed, its goal in language learning "is to build more high-quality autonomous motivation so that students are willing to use the new language to interact and learn without requiring constant effort from the teacher" (McEown and Oga-Baldwin, 2019). This theory posits that intrinsic motivation flourishes when individuals have a sense of autonomy, competence and relatedness (Deci and Ryan, 2015). Autonomy refers to the ability to make choices and have control over one's learning. Competence applies to feeling capable and skilled in the language. Relatedness involves connecting with others, such as teachers and fellow students. When these three psychological needs are fulfilled, students are more likely to be intrinsically motivated and engage actively in language learning, make decisions and monitor progress. It allows applying language learning to multiple contexts both in formal classroom or outside it that often helps integrate real life experiences, in which learning may occur even unintentionally (McEown and Oga-Baldwin, 2019). According to Davis (2020), in terms of autonomy support, SDT research identifies "a number of general and subject area-specific need-supportive teaching strategies" that include "incorporating students' input", acknowledging their emotions and needs, experiences and perspectives, arousing curiosity, providing choices and options, as well as being flexible and open-minded.

Such ability to autonomously and intrinsically motivate oneself is related to self-regulation that implies student's ability to manage and control their cognitive, affective and behavioural processes during the learning experience. It is of special importance under the conditions of distance or online learning environments enforced by first COVID-19 (Przybył and Chudak, 2019), and then combat operations on the territory of Ukraine that undoubtedly challenge students' motivation and cognitive abilities. It calls for higher capacity of autonomy including goal-setting, preparing for the actual learning, choosing optimal learning strategies, self-monitoring and self-assessment, and finally, self-reflection on the effectiveness of one's actions (Przybył and Chudak, 2019). When describing self-regulated learning theory attending to the development of such learning processes as metacognition, motivation, and strategic action, Brenner claims that "metacognitive learners are aware of their personal learning strengths and challenges", "motivated learners are willing to attempt challenging tasks", and "strategic learners have large repertoires of learning strategies" (Brenner, 2022). This means in practice that such self-regulated learning behaviours can be exhibited by self-determined students who are able to take control of their learning and achieve their language learning goals. Davis (2020) also considers persistence and continuity in language learning, which are substantial positive outcomes "of basic psychological need fulfilment and autonomous motivation".

These insights into motivational constructs help us generalize the strategies and tactics of ELA for motivating and supportive learning environments in the key aspects:

- developing competence: designing a well-structured and progressive curriculum, incorporating meaningful topics, including a variety of engaging language activities that target different skills;
- creating achievement situation: acknowledging and reinforcing students' efforts and progress, personalising the learning process;
- arousing integrative motives or relatedness: encouraging peer interaction and collaborative learning, integrating cultural aspects when creating a deeper connection to the language and its speakers, fostering a sense of community among learners, e.g., through discussion forums or social media groups dedicated to language learning;
- developing autonomy or self-regulation: offering a variety of resources and learning materials allowing students to choose what works best for them with the needed guidance and support.

In addition, these considerations help identify the two key pedagogical approaches for effective imple-

mentation of these practical suggestions: differentiated instruction aimed at constructing highly personalised learning environment and motivating student's learning experience, as well as developing English language learning strategies enabling high-quality autonomous motivation. By combining DI and LLSs based on motivational constructs, educators can create inclusive, engaging, and student-centred ELA environments. DI contributes to addressing students' diverse needs by applying varied instructional techniques and customising material, while LLSs development can offer explicit strategy instruction, scaffolded practice, and self-regulation that are discussed further.

4 DIFFERENTIATED INSTRUCTION IN DELIVERING THE EFL UNIVERSITY COURSE

Differentiated instruction (DI), according to its proponents, is a philosophy and not just a set of tools (Gregory and Chapman, 2013). In modern pedagogy, it is seen as an approach that implies modification of teaching and learning routines to address a broad range of students' readiness levels, interests, and modes of learning (Tomlinson, 2001), since "one size doesn't fit all" (Gregory and Chapman, 2013). It involves tailoring instruction and learning experiences to meet the individual needs of students, taking into account their varied learning styles, strengths, and challenges.

DI can be applied in two different ways considering its format: convergent (within one classroom) or divergent (division of students into homogeneous groups) (de Graaf et al., 2019; Jørgensen and Brogaard, 2021). Tomlinson (2017) positing convergent DI defines it as an instruction that "encourages the lifting of ceilings and testing of personal limits and advocates "teaching up," otherwise known as working from a complex curriculum that will challenge advanced learners and providing scaffolding for other students to enable the greatest number possible to access and succeed with the key elements of the complex curriculum and meaning-rich learning experiences" (Tomlinson, 2017, p. 13). Convergent DI takes students from different starting levels towards the same goal, offering "motivating and challenging complex or whole tasks and different levels of support to complete the whole task" (de Graaf et al., 2019), and is implemented through the use of various means like different tasks, tips and assistance, learning aids, support from the teacher, etc. In case of divergent differentiation, the starting level is assumed to be the same, but ultimately the teachers "set goals and develop learning routes for each student based on insights into their abilities and leaning needs" (de Graaf et al., 2019).

The key to successful DI is "the actual adaptation of teaching to the thoroughly identified needs of all students", and the core of DI lies in "deliberate and accurate choices" that are based "on a variety of well-considered goals and the analysis of students' instructional needs, in combination with continuous monitoring of student progress and adapting on the fly" (van Geel et al., 2019, p. 62). Thus, while applying DI, teachers do not "seek or follow a recipe for differentiation, instead, they combine what they can learn about differentiation from a range of sources with their own professional instincts and knowledge base in order to do whatever it takes to reach each learner" (Tomlinson, 2017, p. 10).

Chamberlin and Powers (2010) outline seven core principles guiding DI:

1. Clearly communicated link between curriculum, instruction and (ongoing) assessment that informs about student understanding of material, personal interests and learning profiles.
2. Teachers respond to student differences.
3. Students are challenged at a level that is attainable through lessons that emphasise critical thinking intended to promote individual growth, while expected to participate in respectful work.
4. Teachers and students collaborate in the learning process.
5. Group work is intermixed with whole class discussions and activities. Student groupings are based on readiness, interests, or learning profiles.
6. The approach to differentiated teaching is proactive rather than reactive.
7. Space, time, and materials are utilised to suit the needs of various learners.

Despite obvious advantages of applying these principles in practice, convergent DI is claimed to be complicated due to some aspects (Waiter, 2005, p. 38):

- didactic: it's not easy for the teacher to integrate learning content in a differentiated way, i.e. to distinguish 'fundamentum' for all learners and 'additum' for high performers;
- organisational: DI requires considerable resources at the preparation and implementation stages, e.g., necessary instructional materials,

premises, but when it comes to learning time requirements, they often reach the limits of institution organisation;

- diagnostic: the teacher needs accurate understanding of the students' prior knowledge, both in terms of learning development and the extracurricular learning environment, in order to be able to provide individually tailored learning opportunities that highly demands teacher's diagnostic competence;
- motivational: the incentive for the weaker to orientate themselves towards higher-performing students can fail. This tends to be more positive and motivating for learners with higher performance and those with an average level of performance, while those with lower performance often fall even further behind that may create or validate a negative self-image;
- performance assessment: the comparability of student performance and their fair assessment are made more difficult by working under performance-differentiated working conditions.

Considering the above aspects, the limited time that higher education teachers have at their disposal as "a topic will be covered only once in class" (Turner et al., 2017, p. 492), and the fact that "effective differentiation requires a significant amount of time, effort, and dedication on the part from the instructor" (Santangelo and Tomlinson, 2008, p. 320) as "teaching is one among several other tasks" (Jørgensen and Brogaard, 2021, p. 106), a reasonable and appropriate model of divergent DI can be chosen in order to deliver students as much learning content as it is possible in a limited time period during the EFL University course.

The EFL University course is often related to secondary in significance courses rather than core ones in non-language universities in Ukraine. Nevertheless, it is integrated in all study programmes, and proficiency in the English language is essential for each higher education student to fully engage in the educational process and research activities. It must be considered that the prior language learning experience and aptitude of first-year technical student population is often characterised by apparent discrepancy and unevenness of the entry level of language proficiency ranging from A2 to even C1 according to the Common European Framework of Reference for Languages (CEFR) that complicates the design and implementation of language instruction programmes for this diverse group of students. By "juxtaposing knowledge of increased student diversity with insights related to teaching and learning" (Santangelo and Tomlinson, 2008), higher education language teachers in non-language universities don't have to use uniform and didactic instructional practices in order to "address the experiences and learning needs of the students newly enrolled" (Pliner and Johnson, 2004, p. 106). From this perspective, DI can be regarded as the foundation for applying a student-centred approach when creating favourable conditions of English language learning for a group of students after determining some uniformity or similarity of individual and cognitive factors.

Having sufficient experience of teaching in heterogeneous groups where lower-level students are not given enough opportunities to review or practice to catch up and thus lack self-confidence, while higher-level students are deprived of challenging and competitive learning environment to improve, a reasonable decision is to modify the university EFL course on the basis of divergent DI and provide some organisational arrangements in the form of homogeneous language-level grouping. Tomlinson (2004; 2017), Gregory and Chapman (2013), Santangelo and Tomlinson (2008), etc. have made a comprehensive analysis of teaching practices within the DI framework. Chamberlin and Powers (2010), Kupchyk and Litvinchuk (2020) have contributed to the idea of applying such differentiation not just within one classroom but by placing first-year students into different groups according to the results of the English language entry placement test. They justify the efficiency of implementing DI in non-language universities by claiming that "DI made it possible to design and deliver instruction, starting from where the students were and moving them forward on a learning continuum" (Kupchyk and Litvinchuk, 2020). Jørgensen and Brogaard (2021) also demonstrate in their empirical study that the results of DI application in higher education "include better fulfillment of intended learning outcomes, teaching that is perceived to be meaningful by students at varying academic levels, and a more inclusive learning environment" (Jørgensen and Brogaard, 2021, p. 105).

Considering the definition of DI described as an instructional process of "ensuring that what a student learns, how he or she learns it, and how the student demonstrates what he or she has learned is a match for student's readiness level, interests, and preferred mode of learning" (Tomlinson, 2004, p. 188), divergent DI allows matching content (what the student learns), process of learning (how she or he learns), and product (demonstration of what one has learned), depending on the varying student needs and responding to "student's learning profile characteristics" (Santangelo and Tomlinson, 2008, p. 309). In practice, it is of necessity to investigate, find, and

design solutions about the procedure from assessing the student needs to identifying, analysing, and arranging a hierarchy of objectives of learning and teaching, and then designing and implementing DI, evaluating and possibly redesigning the EFL teaching approaches depending on the students' learning aptitudes, style and conditions. The EFL university course can be presented as a developmental process, in which "language learning must be provided with successive stages each of which represents growth and expansion of the learners' ability to learn, know, use and critically think in a new language" (Kupchyk and Litvinchuk, 2020).

Thus, it allows identifying the key aspects or principles to integrate divergent DI in a non-language university setting:

- didactic: it is much easier for the teacher to deliver learning content in a homogeneous group, where the 'fundamentum' and 'additum' are equal for all students;
- organisational: although considerable time resources and premises (computer classes with the Internet access) are required at the preparation stage (e.g., to diagnose the students' English entry level and divide them into homogeneous groups), it saves time at the implementation stage and requires much less effort in terms of selecting or devising necessary instructional materials thanks to the group homogeneity;
- diagnostic: a reliable English language entry placement test has to be used (devised) in order to precisely identify students' English entry level that reveals the students' prior knowledge, which highly demands teacher's diagnostic competence;
- motivational: a homogeneous language learning environment is considered to be less stressful, most enlivening and stimulating for all students, since being in a group with peers at the same language level adds to more positive learning experience based on creating achievement motives and experiences of success for each student;
- performance assessment: it is much easier to monitor students' progress, compare and fairly assess them on a continuous basis (ongoing formative assessment), and provide timely feedback to guide their learning as working conditions concerning performance are the same.

This will also facilitate the development of LLSs in such a classroom since it helps considering the proficiency levels, abilities and learning styles, scaffolding instruction, explicit teaching and modelling of LLSs, providing resources and support, fostering collaboration and encouraging effective reflection.

5 TEACHING AND LEARNING STRATEGIES IN ENGLISH LANGUAGE ACQUISITION

The term *content of learning* is a basic category in the methodology of foreign language teaching that accumulates everything what a student has to acquire in the process of learning and answers the question "What to learn?", thus embracing such components as (Nikolaieva, 2013):

1) spheres and types of communication, functions, psychological and communicative situations and roles, nonverbal means of communication, communicative goals and aims; themes, problems and texts; communicative skills and exercises for their development;
2) linguo-sociocultural material, social situations; skills to operate these materials and relevant exercises; skills to start an interaction, orient in social situations and lead them, exercises for their development;
3) language material; skills to operate it and exercises for their development;
4) learning and communication strategies; skills to operate them and exercises for their development.

According to the definition above, learning strategies are a constituent part of foreign language learning content in any learning environment and can forward the process of ELA in both formal and non-formal settings.

The term *learning strategy* is characterised by a confusing variety of attempts to define the concept of a strategy. Oxford describes learning strategies as "specific actions taken by the learner to make learning easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations" (Oxford, 1990, p. 8). O'Malley and Chamot (1990) provide a more extended definition of learning strategies and define them as "techniques and devices used by second language learners for remembering and organising samples of the second language. ... Strategies are the thoughts and behaviours that learners use to make them comprehend, learn, or retain information" (O'Malley and Chamot, 1990, p. 43). A more recent definition of LLSs is provided by Schipor and Hammershaug (2022), who consider them to be "systematic and conscious steps, including both thoughts and actions, that are selected and used by learners to enhance their language learning and use, both in a short- and long-term perspective" (Schipor and Hammershaug, 2022, p. 272). Griffiths and Cansiz (2015) do not limit the definition of LLSs

by their intentional use by students, but define them in a broader sense as "actions chosen (either deliberately or automatically) for the purpose of learning or regulating the learning of language" (Griffiths and Cansiz, 2015, p. 476). Neroni et al. (2019) specify them as "processes that involve generating, organising, or converting data for academic achievement" (Neroni et al., 2019), also embracing both intentional and deliberate use of LLSs that may self-regulate the learning process.

To fully understand and operate the existing classifications of LLSs, it is useful to analyse available taxonomies (theories) developed by the researchers (Rubin, 1987; Oxford, 1990; O'Malley and Chamot, 1990; Stern, 1992). Rubin (1987) divides LLSs, incl. communication and social strategies, into cognitive (clarification/verification, guessing/inductive inferencing, deductive reasoning, practice, memorisation, monitoring), and metacognitive (prioritising, setting goals, self-management). A more comprehensive division is conducted by Oxford (1990), who distinguishes between direct and indirect LLSs, further subdivided into a total of six groups (Oxford, 1990). Direct strategies include memory (creating mental linkages, applying images and sounds, reviewing well, employing action, practising), cognitive (receiving and sending messages, analysing and reasoning, creating structure for input and output, guessing intelligently, overcoming limitations in speaking and writing), and compensation. Indirect strategies incorporate metacognitive (centring your learning, arranging and planning your learning, evaluating your learning, lowering your anxiety), affective (encouraging yourself, taking your emotional temperature, asking questions, cooperating with others), and social (empathising with others). O'Malley and Chamot (1990) classify LLSs into metacognitive (thinking about the learning process, monitoring one's production or comprehension, planning for learning and its evaluating after the completion of an activity), cognitive (direct manipulation of the learning material: repeating/revising, resourcing, translating, grouping, note taking, deduction, recombining, creating images, auditory representation, using keywords, contextualising, elaborating, content transfer), and socio-affective (social-mediating activity, transacting with others, cooperating and guessing for clarification) (O'Malley and Chamot, 1990). Stern (1992) defined five subcategories of LLSs: management and planning (deciding on the commitment to language learning, setting reasonable goals, deciding on an appropriate methodology, selecting appropriate resources, monitoring progress, evaluating achievement in the light of previously set goals), cognitive (targeted at learning or problem solving and embracing analysis, transformation, synthesis of learning material), communicative-experiential (circumlocution, gesturing, paraphrase, asking for repetition and explanation), interpersonal (monitoring development, evaluating performance, contacting with native speakers and cooperating with them), and affective (creating associations of positive attitude towards the foreign language and its speakers as well as towards the learning activities involved) (Stern, 1992).

Identifying the learning strategies, which "deliver the most optimal benefit for academic performance" (Donker et al., 2014), is vital both for students to succeed in their studies and teachers to provide valuable support. The practical suggestions that can be derived from the available taxonomies to be used by teachers are the following:

- encouraging students to explore and identify the learning strategies that best work for them. This can be done through self-reflection, trial and error, and feedback from teachers or peers;
- emphasising the importance of direct strategies, incl. memory and cognitive such as memorising and analysing, practising and reviewing, etc. Providing students with explicit instruction and guidance on how to effectively employ these strategies to enhance their understanding, retention, and application of English language skills;
- fostering indirect or metacognitive skills by teaching them to prioritise their learning, set goals, manage their learning process, and evaluating their progress;
- integrating affective and social strategies, highlighting the significance of communication and target language interaction.

There has been extensive research on the use of different strategies by primarily good (successful) language learners (Griffiths, 2008). It is believed that the awareness and refinement of the strategies applied are proved to directly depend on the learner's language proficiency since high-level students are observed to use strategies relating to interaction with others, vocabulary enrichment, extensive reading, dealing with language systems rather than separate patterns, as well as utilising available resources more willingly (Griffiths, 2008). They are often highly motivated, ready to use extensively metacognitive strategies to manage their own learning. The students who are able to self-regulate their learning are defined as "active, responsible learners who act purposefully (i.e. use learning strategies) to achieve their academic goals" (Donker et al., 2014). It supports Gardner's views that "attitudes and motiva-

tion are important because they determine the extent to which the individuals will actively involve themselves in learning the language. The prime determining factor is motivation" (Gardner, 1985). Han and Lu (2018) empirically justified that the high need for achievement stipulated much wider students' use of all the six categories of strategies identified by Oxford (1990) than by those whose achievement motivation is lower (Han and Lu, 2018).

Since cognitive learning strategies may be formed through the "teacher-learner" cooperation, the teacher has to understand how to deliver the required learning content to the student and apply appropriate teaching strategies and tactics in practice, depending on students' learning profile, their needs and interests.

Current education is undergoing rapid changes aimed at improvement through the use of tools such as robotics and augmented reality, which contribute to improving learning scenarios, allowing students to develop their metacognitive skills using technological environments designed to educate and be a medium in the educational process (Muñoz and Morales, 2021, p. 73). Within the landscape of language learning, technology has become "ecological and normalised rather than a supporting tool" (Zhou and Wei, 2018, p. 471). It provides personalised language instruction and materials, advanced access to information, offers more communication possibilities, shapes positive learner identity, and maintains motivation for learning (Bećirović et al., 2021). Computer technology is claimed to be abundant in three language learning skill areas (listening, reading and writing), but scant in speaking (Zhou and Wei, 2018, p. 472). Hence, students have to explore strategies for effective language learning in digital realms (Oxford and Lin, 2011) in order to become self-regulated and further self-directed in English language acquisition.

Zhou and Wei (2018) carried out a meta-analysis of 60 research studies in the field of technology-enhanced language learning to substantiate how it enhances students' self-regulated learning. The meta-analysis by Garzón et al. (2023) proves positive effects of using mobile devices in learning English since each student has their own learning style and preferences. M-learning is seen as a "versatile and flexible approach" (Garzón et al., 2023, p. 9) to learning as it "yields better results when compared either with traditional lectures, traditional pedagogical tools, or other multimedia resources" (Garzón et al., 2023, p. 12), and mobile devices are regarded as pedagogical tools that encourage students to actively construct their learning. The studies of Zhou and Wei (2018), Bin-Hady and Al-Tamimi (2021) outline that students in the Digital Age who benefit from proper LLS instruction outperform their counterparts having not received such training both in language learning efficiency and language skills. Strategies-based instruction, which is enhanced by technology, produces impressive outcomes in terms of developing strategic, self-regulated language learners. Thus, curriculum designers need to augment textbook materials by integrating technology-based learning strategies, and teachers have to be ready to encounter and make use of generative AI like ChatGPT, launched by OpenAI in November 2022, as an educational tool both "standalone or integrated into other systems and platforms" (Sanzalieva and Valentini, 2023, p. 8). Dai et al. (2023) stipulate that "the technological architecture of ChatGPT and other GPT models can be leveraged to enhance learning analytic techniques, generate customised scaffoldings, facilitate idea formation, and eventually expand educational access and resources for social justice" (Dai et al., 2023, p. 2). In English language learning, students can benefit as "the personalised learning experiences enabled by ChatGPT highlight the significance of learning how to learn, and AI tools are meant to facilitate student learning, not replace human efforts", as well "by self-regulating the learning process, students can avoid over-reliance on AI-generated answers and maintain a balance between independent problem solving and seeking AI assistance" (Dai et al., 2023, p. 5). Such assistance can be provided in getting grammar explanations, having grammar and spelling corrected, writing and editing stories, inventing personalised study plans, etc.

Digitally enhanced English language learning connects a student with the recent authentic foreign language content via different online platforms. This format fosters students to develop their own learning strategies (both cognitive and metacognitive, as well as affective), construct their learning environment, add to their learning experience, and increase their progress. Working in a digitally-enhanced environment, a teacher has to differentiate instruction and apply appropriate teaching forms and methods, develop their teaching strategies that are aimed at familiarising students with the existing LLSs that they can use and adjust to themselves.

Thus, *language learning strategies* are a part of *content* that has to be learnt; an essential constituent of the *process* of acquiring English language skills that forwards and facilitates learning, makes it more motivational, and allows students to manage and self-regulate their learning; and finally, LLSs are a *product* of English language acquisition becoming crucial for lifelong self-directed learning.

6 CONCLUSION

The discussed issues may be regarded today as the cornerstones in ELA taking place in both formal and informal settings, since these findings contribute to providing continuous language learning experience. Interruptions in education due to current social challenges, different prior language learning experience and aptitudes of students at tertiary level in non-language educational institutions, as well as their individual learning behaviour, can be compensated by considering and affecting individual factors such as positive attitudes and motivation, broadening motivational constructs, providing structured support and guidance with DI, and addressing cognitive factors like strategic awareness. Considering motivational constructs helps drive and sustain students' engagement and success in ELA, create conducive and supportive learning environment. Divergent DI in ELA in a non-language university setting is proven to be less time-consuming for teachers, and more stimulating and less stressful for students. It fosters students' growth in learning English through following successive routes in a homogeneous peer group. Meanwhile, it entails developing LLSs that are taught as a part of content, help shape the process of ELA and become finally an asset for students enabling them to construct, self-regulate, and further self-direct the process of learning languages in different settings following different goals. In this framework, students are engaged in constructing their learning environments, they can manage the learning process, when using the necessary strategies, and self-monitor their progress. Foreign language teachers, in turn, can effectively reflect on emerging opportunities and create a flexible but ordered system with a higher rate of practicality and personalisation. Thus, DI and LLSs are crucial for developing sustained motivation which is viewed as the greatest incentive to learn languages life-long.

REFERENCES

Al-Hoorie, A. H. and MacIntyre, P. D. (2019). *Contemporary Motivation Theory: 60 Years since Gardner and Lambert (1959)*. Multilingual Matters, Bristol, UK.

An, Z., Wang, C., Li, S., Gan, Z., and Li, H. (2021). Technology-Assisted Self-Regulated English Language Learning: Associations With English Language Self-Efficacy, English Enjoyment, and Learning Outcomes. *Frontiers in Psychology*, 11. https://doi.org/10.3389/fpsyg.2020.558466.

Bećirović, S., Brdarević-Čeljo, A., and Delić, H. (2021). The use of digital technology in foreign language learning. *SN Social Sciences*, 1(10):246. https://doi.org/10.1007%2Fs43545-021-00254-y.

Bin-Hady, W. R. A. and Al-Tamimi, N. O. M. (2021). The use of technology in informal English language learning: evidence from Yemeni undergraduate students. *Learning and Teaching in Higher Education: Gulf Perspectives*, 17(2):107–120. https://doi.org/10.1108/LTHE-09-2020-0037.

Brenner, C. A. (2022). Self-regulated learning, self-determination theory and teacher candidates' development of competency-based teaching practices. *Smart Learning Environments*, 9(1):3. https://doi.org/10.1186/s40561-021-00184-5.

Chamberlin, M. and Powers, R. (2010). The promise of differentiated instruction for enhancing the mathematical understandings of college students. *Teaching Mathematics and its Applications: An International Journal of the IMA*, 29(3):113–139. https://doi.org/10.1093/teamat/hrq006.

Dai, Y., Liu, A., and Lim, C. P. (2023). Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education. *Procedia CIRP*, 119:84–90. The 33rd CIRP Design Conference. https://doi.org/10.1016/j.procir.2023.05.002.

Davis, W. S. (2020). Encouraging continued university foreign language study: a self-determination theory perspective on programme growth. *The Language Learning Journal*, 50(1):29–44. https://doi.org/10.1080/09571736.2020.1740768.

de Graaf, A., Westbroek, H., and Janssen, F. (2019). A Practical Approach to Differentiated Instruction: How Biology Teachers Redesigned Their Genetics and Ecology Lessons. *Journal of Science Teacher Education*, 30(1):6–23. https://doi.org/10.1080/1046560X.2018.1523646.

Deci, E. L. and Ryan, R. M. (2015). Self-Determination Theory. In Wright, J. D., editor, *International Encyclopedia of the Social & Behavioral Sciences*, pages 486–491. Elsevier, Oxford, second edition. https://doi.org/10.1016/B978-0-08-097086-8.26036-4.

Donker, A. S., de Boer, H., Kostons, D., Dignath van Ewijk, C. C., and van der Werf, M. P. C. (2014). Effectiveness of learning strategy instruction on academic performance: A meta-analysis. *Educational Research Review*, 11:1–26. https://doi.org/10.1016/j.edurev.2013.11.002.

Dörnyei, Z. (2005). *The Psychology of the Language Learner: Individual Differences in Second Language Acquisition*. Second Language Acquisition Research Theoretical and Methodological Issues. Lawrence Erlbaum, Mahwah, NJ and London. https://cstn.files.wordpress.com/2009/11/the-psychology-of-the-language-learner-3haxap.pdf.

Dörnyei, Z. and Al-Hoorie, A. H. (2017). The Motivational Foundation of Learning Languages Other Than Global English: Theoretical Issues and Research Directions. *The Modern Language Journal*, 101(3):455–468. https://doi.org/10.1111/modl.12408.

Dörnyei, Z. and Ryan, S. (2015). *The Psychology of the Language Learner Revisited*. Routledge, Taylor and

Francis Group, New York and London. https://doi.org/10.4324/9781315779553.

Dörnyei, Z. and Ushioda, E. (2011). *Teaching and Researching: Motivation*. Pearson, Harlow, 2nd edition. https://doi.org/10.4324/9781315833750.

Elliot, A. J., Dweck, C. S., and Yeager, D. S., editors (2017). *Handbook of Competence and Motivation: Theory and Application*. The Guilford Press, New York and London, 2nd edition. https://chools.in/wp-content/uploads/2021/03/Handbook-of-Competence-and-Motivation_-Theory-and-Application.pdf.

Eraldemir Tuyan, S. and Serindağ, E. (2019). Revisiting the socio-educational model of second language acquisition in Turkish tertiary EFL context. *Journal of Language and Linguistic Studies*, 15(2):450–469. https://doi.org/10.17263/jlls.586105.

Gardner, R. G. (1985). *Social Psychology and Second Language Learning: The Role of Attitudes and Motivation*, volume 4 of *The Social Psychology of Language*. Edward Arnold, Baltimore, MD. https://publish.uwo.ca/~gardner/docs/SECONDLANGUAGE1985book.pdf.

Garzón, J., Lampropoulos, G., and Burgos, D. (2023). Effects of Mobile Learning in English Language Learning: A Meta-Analysis and Research Synthesis. *Electronics*, 12(7):1595. https://doi.org/10.3390/electronics12071595.

Gregory, G. H. and Chapman, C. (2013). *Differentiated instructional strategies: One size does not fit all*. Corwin Press, Thousand Oaks, CA, 3rd edition.

Griffiths, C. (2008). Strategies and Good Language Learners. In Griffiths, C., editor, *Lessons from Good language learners*, pages 83–98. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511497667.009.

Griffiths, C. and Cansiz, G. (2015). Language learning strategies: An holistic view. *Language Learning and Teaching*, 5(3):473–493. https://doi.org/10.14746/ssllt.2015.5.3.7.

Han, J. and Lu, Q. (2018). A Correlation Study among Achievement Motivation, Goal-Setting and L2 Learning Strategy in EFL Context. *English Language Teaching*, 11(2):5–14. http://doi.org/10.5539/elt.v11n2p5.

Jørgensen, M. T. and Brogaard, L. (2021). Using differentiated teaching to address academic diversity in higher education: Empirical evidence from two cases. *Learning and Teaching*, 14(2):87–110. https://doi.org/10.3167/latiss.2021.140206.

Kupchyk, L. and Litvinchuk, A. (2020). Differentiated Instruction in English Learning, Teaching and Assessment in Non-Language Universities. *Advanced Education*, 7(15):89–96. https://doi.org/10.20535/2410-8286.168585.

Lai, Y., Saab, N., and Admiraal, W. (2022). Learning Strategies in Self-directed Language Learning Using Mobile Technology in Higher Education: A Systematic Scoping Review. *Education and Information Technologies*, 27:7749–7780. https://doi.org/10.1007/s10639-022-10945-5.

Lamb, M., Csizér, K., Henry, A., and Ryan, S., editors (2020). *The Palgrave Handbook of Motivation for Language Learning*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-28380-3.

MacIntyre, P. (2010). Symposium – Perspectives on Motivation for Second Language Learning on the 50th Anniversary of Gardner & Lambert (1959). *Language Teaching*, 43(3):374–377. https://doi.org/10.1017/S0261444810000108.

McEown, M. S. and Oga-Baldwin, W. L. Q. (2019). Self-determination for all language learners: New applications for formal language education. *System*, 86:102124. Special Issue: New directions for individual differences research in language learning. https://doi.org/10.1016/j.system.2019.102124.

Muñoz, L. E. and Morales, I. (2021). Development of Teaching-Learning Strategies Through Technology. In Negrón, A. P. P. and Muñoz, M., editors, *Latin American Women and Research Contributions to the IT Field*, page 73–94. IGI Global, Hershey, PA. https://doi.org/10.4018/978-1-7998-7552-9.ch004.

Neroni, J., Meijs, C., Gijselaers, H. J. M., Kirschner, P. A., and de Groot, R. H. M. (2019). Learning strategies and academic performance in distance education. *Learning and Individual Differences*, 73:1–7. https://doi.org/10.1016/j.lindif.2019.04.007.

Nikolaieva, S. Y. (2013). *Methods of teaching foreign languages and cultures: theory and practice: a textbook for the students of classical, pedagogical and linguistic universities*. Lenvit, Kyiv.

O'Malley, J. M. and Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9781139524490.

Oxford, R. L. (1990). *Language Learning Strategies: What Every Teacher Should Know*. Newbury House Publishers, New York.

Oxford, R. L. (2016). *Teaching and Researching Language Learning Strategies: Self-Regulation in Context*. Routledge, New York, 2nd edition. https://doi.org/10.4324/9781315719146.

Oxford, R. L. and Lin, C.-Y. (2011). Autonomous learners in digital realms: Exploring strategies for effective digital language learning. In Morrison, B., editor, *Independent Language Learning: Building on Experience, Seeking New Perspectives*, pages 157–172. Hong Kong University Press, Hong Kong. https://doi.org/10.5790/hongkong/9789888083640.003.0012.

Pliner, S. M. and Johnson, J. R. (2004). Historical, Theoretical, and Foundational Principles of Universal Instructional Design in Higher Education. *Equity & Excellence in Education*, 37(2):105–113. https://doi.org/10.1080/10665680490453913.

Przybył, J. and Chudak, S. (2019). University students' self-regulation in standard and enforced online language learning. *Moderna Språk*, 116(1):47–66. https://doi.org/10.58221/mosp.v116i1.6925.

Redmer, G. (2022). Self-Regulation in an Advanced Language Learner: A Case Study of Language Learning Strategies. *Studies in Self-Access Learning Journal*, 13(1):60–76. https://doi.org/10.37237/130104.

Rubin, J. (1987). Learner Strategies: Theoretical Assumptions, Research History and Typology. In Wenden, A. L. and Rubin, J., editors, *Learner Strategies in Language Learning*, pages 15–30. Prentice Hall, Englewood Cliffs.

Sanchez, M. A. and Lidawan, M. W. (2020). Galvanizing strategic and independent learning with learning technologies. *European Journal of Literature, Language and Linguistics Studies*, 4(1):14–47. https://www.oapub.org/lit/index.php/EJLLL/article/view/180.

Santangelo, T. and Tomlinson, C. A. (2008). The Application of Differentiated Instruction in Postsecondary Environments: Benefits, Challenges, and Future Directions. *International Journal of Teaching and Learning in Higher Education*, 20(3):307–323. https://www.isetl.org/ijtlhe/ijtlhe-article-view.php?mid=366.

Sanzalieva, E. and Valentini, A. (2023). ChatGPT and Artificial Intelligence in higher education: Quick start guide. https://unesdoc.unesco.org/ark:/48223/pf0000385146.

Sapan, M. and Mede, E. (2022). The Effects of Differentiated Instruction (DI) on Achievement, Motivation, and Autonomy among English Learners. *Iranian Journal of Language Teaching Research*, 10(1):127–144. https://doi.org/10.30466/ijltr.2022.121125.

Schipor, D. and Hammershaug, V. S. (2022). Language Learning Strategies in the 2020 National Curriculum for English. In Dypedahl, M., editor, *Moving English Language Teaching Forward: Festschrift to Ragnhild Elisabeth Lund*, page 271–294. Cappelen Damm Akademisk. https://press.nordicopenaccess.no/index.php/noasp/catalog/view/166/886/7192.

Stern, H. H. (1992). *Issues and Options in Language Teaching*. Oxford University Press, Oxford.

Tomlinson, C. A. (2001). *How to Differentiate Instruction in Mixed-Ability Classrooms*. Association for Supervision and Curriculum Development, Alexandria, VA, 2nd edition. https://rutamaestra.santillana.com.co/wp-content/uploads/2020/01/Classrooms-2nd-Edition-By-Carol-Ann-Tomlinson.pdf.

Tomlinson, C. A. (2004). Point/counterpoint: Sharing responsibility for differentiating instruction. *Roeper Review*, 26(4):188–189. https://doi.org/10.1080/02783190409554268.

Tomlinson, C. A. (2017). *How to Differentiate Instruction in Academically Diverse Classrooms*. Association for Supervision and Curriculum Development, Alexandria, VA, 3rd edition.

Turner, W. D., Solis, O. J., and Kincade, D. H. (2017). Differentiated Instruction for Large Classes in Higher Education. *International Journal of Teaching and Learning in Higher Education*, 29(3):490–500. https://www.isetl.org/ijtlhe/ijtlhe-article-view.php?mid=2735.

UNESCO Institute for Lifelong Learning (2022). *Making Lifelong Learning a Reality: A Handbook*. UNESCO Institute for Lifelong Learning, Hamburg, Germany. https://unesdoc.unesco.org/ark:/48223/pf0000381857.

van Geel, M., Keuning, T., Frèrejean, J., Dolmans, D., van Merriënboer, J., and Visscher, A. J. (2019). Capturing the complexity of differentiated instruction. *School Effectiveness and School Improvement*, 30(1):51–67. https://doi.org/10.1080/09243453.2018.1539013.

Waiter, W. (2005). *Unterrichtsprinzipien*. Auer Verlag, Augsburg, 2 edition.

Yue, Z., Zhao, K., Meng, Y., Qian, X., and Wu, L. (2022). Toward a Better Understanding of Language Learning Motivation in a Study Abroad Context: An Investigation Among Chinese English as a Foreign Language Learners. *Frontiers in Psychology*, 13. https://doi.org/10.3389/fpsyg.2022.855592.

Zaytseva, I. V., Vysotchenko, S. V., Liahina, I. A., and A., M. I. (2021). EFL University Students Challenges in the Process of Online Learning of Foreign Languages in Ukraine. *Arab World English Journal (AWEJ)*, (Special Issue on Call 7):70–77. https://doi.org/10.24093/awej/call7.5.

Zhou, Y. and Wei, M. (2018). Strategies in technology-enhanced language learning. *Studies in Second Language Learning and Teaching*, 8(2):471–495. https://doi.org/10.14746/ssllt.2018.8.2.13.

Prevention of Shopaholism in Students of Higher Education Institutions

Ivanna Parfanovich[1][a], Iryna Trubavina[2,3][b] and Uliana Huzik[4]

[1]*Ternopil Volodymyr Hnatiuk National Pedagogical University, 2 Maksyma Kryvonosa Str., Ternopil, 46027, Ukraine*

[2]*Luhansk Taras Shevchenko National University, 7 Vokzalna Str., Lubny, 37500, Ukraine*

[3]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[4]*Dzhurynsko-Slobidkiv branch of the Dzhurynskyi reference institution of general secondary education of the I-III degrees of the Bilobozhnytsk village council of the Ternopil region, 11 Shkilna Str., Dzhurynska Slobidka, 48571, Ukraine*

parfanovichi@ukr.net, trubavina@gmail.com, ulyanka13@ukr.net

Keywords: Shopaholism, People Likely to Be Shopaholics, Preventive and Corrective Work, the Program of Actions of Prevention.

Abstract: The article deals with the phenomenon of shopaholism which is characterized as a harmful habit, unhealthy condition and/or disease because of a depressive state, psychoemotional problems, killing time or varying leisure and lifestyle. The prevention of shopaholism is possible on condition of coordinative actions of those taking part in prevention that is why, the focus should be on the peculiarities of program implementation and on providing diagnosis and prevention. The ways of the implementation of the research tasks are varied including determination of life values and principles of people likely to be shopaholics; devising the program of working with women; ways of program implementation in different institutions and organizations responsible for deviant behavior prevention; scientific and methodological grounds for the technique of shopaholism prevention and correction; expertized evaluation and analysis of the results of the preventive and therapeutical measures; finding out appropriate ways of prevention and treating shopaholism. The development and implementation of the project of prevention and treating shopaholism helps: to implement diagnostic and methodological results concerning revealing target groups and signs of shopaholism; to define the efficiency of the technique of dealing with the mentioned group; to achieve positive results what is proved by the research.

1 INTRODUCTION

Traditionally, the prevention of deviant behavior was the subject of activities of social services and educational institutions. But they engaged in traditional negative habits and manifestations. Shopaholism was not considered an actual problem. Today, this type of deviant behavior requires significant efforts on the part of society and, first of all, on the part of educational institutions.

Deviant behaviour is ***asocial, amoral*** (minor violations of the social life standards), ***auto-aggressive*** *which is divided into addictive and suicidal,* ***unlawful*** (significant violations of the norms of social life). Shopaholism according to such division refers to auto-aggressive addictive behaviouur. This kind of deviation should be considered both as a social phenomenon due to its significant prevalence, and as a deviant behaviour of an individual through the deformation of values, standards of behaviour. Preventing and treating this kind of deviant behaviour of individuals is important not only for the correction and rehabilitation of their social development and psychoemotional health, but also for the well-being of their relatives and loved ones, and hence for the microsocial environment and society in general.

In our definition, "prevention" (warning, overcoming) of deviant behavior is a normative-legal, social-organizational, psychological-pedagogical process of organizing and implementing a set of measures that ensure the social-psychological development of an individual. Accordingly, "prevention", "warning" are measures aimed at preventing the formation of negative manifestations and deviations in the development of a person, and "overcoming" is the elimination of deviations in the development and vital activities of a person.

[a] https://orcid.org/0000-0002-5300-7092

[b] https://orcid.org/0000-0003-1057-430X

Parfanovich, I., Trubavina, I. and Huzik, U.
Prevention of Shopaholism in Students of Higher Education Institutions.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 98-106
ISBN: 978-989-758-579-1

2 AIM

The aim of the article is to determine the specifics of the prevention of shopaholism as a type of deviant behavior, its causes and consequences for the individual and society. This, in particular, involves the need to: determine the essence of the phenomenon; to reveal the specifics of diagnosing shopaholism among the population; to establish effective ways of preventing and overcoming this type of deviation in institutions of higher education with student youth and in the individual development and behavior of a person.

3 MATERIALS AND METHODS

The problem of behavioural deviations became the subject of research of the scientific and research laboratory for the diagnosis and prevention of deviant behaviour, which operates on the basis of Ternopil Volodymyr Hnatiuk National Pedagogical University. Effective diagnostics and preventive maintenance of shopaholism are one of the directions the laboratory is working on.

Auto-aggression is the manifestation of destructive activity directed by a person straight on themselves. The types of auto-aggression are the following: tobacco, alcohol, drug, computer, game addiction, bulimia and anorexia, suicidal and parasuicidal behaviour (UkrLoves.com, 2017). In cases of non-chemical addictions, the attention is permanently fixed on certain subjects (stamps, books, weapons) or activities (sex, work, food consumption, taking care about a man-alcoholic, communicating with a computer). These subjects or activities gradually displace normal contacts with people, love, care for their loved ones, rest, need in friendly support (Popov and Brug, 2005).

The phenomenon of oniomania was first noted by the famous German psychiatrist Kraepelin (1915), a "discoverer" of schizophrenia and manic depression. He noticed that it was very similar to other types of addictions (Nechaenko, 2011).

The stages of the formation of shopaholism are: the first – a sudden, meaningless purchase; the second – experimentation; the third – a desire to buy; the fourth – purchases are made on any occasion, the criticality of purchase is lost; the fifth – constant sense of guilt (Shopogolizm, 2015).

Today, online shopping or e-shopping is where anyone can buy goods or services using a provided application or web browser on the Internet (Huei et al., 2023).

Theoretical approaches of scientists to this problem are classified by the determinants of oniomania: ***biological*** (Nechaenko, 2011); ***social*** (Jhang, 2018; Shopogolizm, 2015); ***pedagogical*** (Nechaenko, 2011); ***psychological*** (Romanchukevich, 2013). Many scholars consider a complex of reasons affecting the emergence of shopaholism. The present study was descriptive qualitative in design, consisting of a few case studies based on semi structured interview of individuals high on shopaholism, consisting information about participants'. Before and after affect of shopping, motivation, causes and other related significant information regarding their shopping behavior was also explored (Sharma et al., 2020; Hunter, 2018; Ghosh, 2013; Gust, 2015; Yuh and Choi, 2017).

Thus, oniomania as a social phenomenon is still most common among women. This is evidenced by the following argument: "A woman is a biological person who biologically has a more developed hemisphere of the brain, which is responsible for emotions and irrational perception of the world, and it is this that plays a predominant role in the emergence of tension in the departments that control emotions" (Nechaenko, 2011; Tyagi and Shyam, 2019). Scientists are also convinced that in most cases women suffer from oniomania and because of the prevalence of such emotions as lack of love, recognition, the presence of a feeling of emotional emptiness, depression.

The consequences of shopaholism are severe: feelings of guilt; nervous tension or breakdowns; exhaustion; apathy; irritability; financial losses.

It is proposed to carry out diagnostics of the presence of oniomania according to the ***criteria***: frequent purchasing concerns or sudden impulses to buy something; regular purchases of unnecessary things usually not correspondent to available funds or a significant increase in shopping time compared to the one originally scheduled; purchasing troubles, sudden purchases or the associated behavioural features are accompanied by expressive distress, inadequate loss of time, become a serious obstacle both in everyday life and professional field, or cause financial problems (e.g., debt or bankruptcy); excessive purchasing or going shopping is not necessarily manifested in periods of hypomania or mania (Noykina, 2012).

Domestic and foreign scholars offer mechanisms for displacement and replacement of shopaholism as a form of behavioural deviations by establishing positive social relations in interpersonal and intersexual aspects, socially positive ways of self-actualization (Jhang, 2018; Kireicheva and Kireichev, 2006; Nechaenko, 2013; Liu, 2016; Noykina, 2012; Yuh and Choi, 2017).

Various approaches of the research significance of

shopaholism in the life of society and individuals are investigated:

- Contemporary culture encourages shopping to abate negative emotions or alter one's disposition (Hunter, 2018);
- The papers investigate shopaholism as a linguistic term (Callies, 2016);
- The research is dedicated to analysis of stars' shopaholism (Gust, 2015);
- The role of Fashion and Commodity Fetishism in the formation of shopogolism is defined (Ghosh, 2013).

Thus, having analyzed the views of the researchers of shopaholism, such conclusions are drawn: many scientists define oniomania as a disease or a pathological condition of a person; presence of oniomania manifestations testifies to an uncomfortable condition of a person, deterioration of social development, psychological well-being; predominantly, the phenomenon of shopaholism is characteristic of female persons through the psycho-emotional mechanism of the emergence and formation of addiction; oniomania has biomedical, psychological, pedagogical and social determinants; prevalence of the defined determinants of oniomania emergence and development indicates a stable tendency towards deformation in the development and behaviour of a person, in particular, social disorganization.

Thus, shopaholism can be defined as a *bad habit; unhealthy condition and/or disease; the consequence of a depressed state, psycho-emotional problems; diversification of time, leisure, life.*

The problem of behavioural deviations became the subject of research of the scientific and research laboratory for the diagnosis and prevention of deviant behaviour, which operates on the basis of Ternopil Volodymyr Hnatiuk National Pedagogical University (90 female students), Kharkiv National Pedagogical University named after H. Skovoroda (72 female students).

The scientific and methodological substantiation and the results of the practical solution of the tasks set are presented below. Work on the specified issue has been carried out by the scientific and research laboratory since 2013. As diagnostic tools of the study served: a) questionnaires; b) polls; c) specialized diagnostic techniques.

In the course of study a comparison of diagnostic data, obtained with the help of A. N. Orel's method and our own one, has been conducted. The method developed by Orel (2004) is a set of specialized diagnostic scales aimed at measuring the readiness (predisposition) for the implementation of separate forms of behaviour with deviations. According to these scales, 90 females aged 18-25 were diagnostically examined, and the results are presented in table 1.

The questionnaire according to A. N. Orel's methods includes both male and female versions. The female version contains 107 statements that should be analyzed by the person being tested. From a number of statements concerning life, character, habits, one needs to choose what corresponds to the person interviewed and mark it in the response form with the number of a statement. Each answer according to the key is assigned 1 point. Further, the total score is calculated according to each scale that is presented in table 1, which is compared with the test standards. If the deviation of the individual results from the standards is observed, a psychological feature is defined as expressed. In table 1 the data on the mass fraction of those women from the total number of respondents who have high, average and low indicators are given and these data as a percentage of the total number of persons involved in the diagnosis according to A. N. Orel's methods are presented.

Identifying people belonging to a risk group is the first step in a diagnostic examination. The second is the detection of a person's predisposition to shopaholism. Conducting a comprehensive comparative survey eliminates the possibility of an error, ignoring some indicators. We used a developed questionnaire. The poll is aimed at analyzing the problem comprehensively: What, in your opinion, is "shopaholism"? Do you consider yourself a shopaholic? How do you feel about this category of people? Do you think that shopaholism is a problem? Have you ever thought that you are spending too much money on buying things you do not need? What features do you pay attention to during the purchase: quality or quantity? Do you agree with the idea "Clothes are never enough"? Why? Is it needful to plan purchases? Do you have close friends, who are prone to shopaholism? Do you know how to cope with this problem? In addition, we offer a set of diagnostic methods that can be used in the monitoring process and identifying shopaholism as a form of deviant behaviour (Parfanovych, 2009).

Having conducted the research on the basis of Ternopil Volodymyr Hnatiuk National Pedagogical University, State Higher Educational Institution "Ternopil College for Food Technologies and Trade", covering 90 girls and young women aged 18 to 25, found that 81 girls of the respondents were not characterized by a tendency to such addiction as shopaholism. However, among those identified with the predisposition (9 girls), too, not all of them have the same degree of behaviour: *2* girls – *have clearly*

Table 1: The results of the diagnostic examination of females in order to reveal signs of predisposition to deviant behaviour (based on A. N. Orel's methods).

Scales	Indexes		
	High	**Medium**	**Low**
1. The scale of the targeting on social desirability (job scale)	–	5%	95% (the tested are not prone to conceal their own norms and values, adjust their answers in the direction of social desirability)
2. The scale of predisposition to overcome norms and rules	6%	12%	82% (conformal settings of the tested, the tendency to follow the stereotypes and norms of behaviour)
3. The scale of predisposition to addictive behaviour	–	11%	89% (indeterminacy of the above-mentioned tendencies, good social control of behavioural reactions)
4. The scale of predisposition to self-damaging and self-destructive behaviour	–	16%	84% (lack of readiness to implement self-destructive behaviour, lack of inclination to implement complexes of guilt in behaviour)
5. The scale of predisposition to aggression and violence	–	22%	78% (high level of social control of behavioural reactions)
6. The scale of volitional control of emotional reactions	2%	9%	89% (strict self-control of any behavioural emotional reactions, sensory impulses)
7. The scale of predisposition to delinquent behaviour	–	3%	97% (high level of social control)
Scales average mean	1.1%	12.5%	86.4%

expressed signs; *4* girls – *constitute a risk group*; *3* girls – *are characterized by periodic or partial manifestations of this addiction*.

As in the analysis based on the methodology of A. N. Orel, a shift in the personal spheres of those individuals who are prone to shopaholism is also observed: *cognitive* (low self-esteem, lack of self-confidence, recognition at work or desired career growth, dissatisfaction with their appearance); *psychoemotional* (absence or lack of attention of your loved ones, feeling of loneliness, need for recognition and love, depression, life routine, severe disappointments in people, psycho-emotional injuries such as violence, death of a loved one, illness, psychological problems from childhood, sexual dissatisfaction, lack of parental love and attention); *volitional* (lowered level of self-regulation, illusion of power, limited spending of money, due to its lack, insignificant amount of pocket money, or too strict prohibitions).

Almost all females (except for three) involved in the diagnosis have shown readiness to correct their behaviour, the desire to improve their social development and psycho-emotional feeling. The developed project of the program for prevention and treating shopaholism was aimed at the problems mentioned above. The main target audience includes people aged 18-27 years, who have different degrees of predisposition to shopaholism.

The evaluation of the work result is based on the established criteria of effectiveness. The defined criteria are indicators of work based on the dynamics of quantitative and qualitative indicators obtained at different stages of work. The following points served for the assessment of the effectiveness of diagnostic and preventive work: a) conclusions of all participants of the project; b) well-being and personal orientation of persons prone to shopaholism. The work within the framework of the program was characterized by *mass, group and individual measures*.

Mass measures and features of their implementation aimed at prevention and treating shopaholism among female students of higher education institutions are presented in table 2. It is advisable to use handouts (booklets) with the indicated list of a) regulations with their short content characteristics; b) social structures of the state and international levels, whose activities are aimed at protecting the rights of women; c) methodical recommendations with comments and explanations concerning the mechanism of the appeals of women to social institutions and organizations. And also including periodic coverage of the program implementation process in mass media.

Conducting **group** preventive work with females, who are prone to shopaholism, is a significant part of corrective and rehabilitation work.

The requirements for group work are as follows: *1. Sincerity in communication. 2. Mandatory participation in the group work during the whole time. 3. The right of each member of the group to say "stop" 4. Each participant speaks for himself, on his own behalf and does not speak for the other. 5. Do not criticize and acknowledge the right of everyone to express*

Table 2: Mass prevention measures to prevent and overcome shopaholism among women (based on the results of the implementation of the developed project).

Peculiarities of measures implementation
1. ***Press conference***. It is conducted with an aim to update the problem and highlight the results of the program implementation. The subject of the press conference is determined in the process of work and conditioned by the nature of urgent problems. The participants of the program and those social structures, the participation of which requires an in-depth approach to solving current and/or operational issues are involved before the press conference.
2. ***Round table***. It is used as a form of preventive and corrective-rehabilitation work for 1) discussion of urgent issues with the involvement of subjects of prevention (program participants, employees of state executive bodies and local municipal bodies, and 2) women who are ready for and capable of self-disclosure and / or speech on particular issues subjected to coordinated activities of a psychologist, social workers.
3. ***Psycho-correction lesson***. Conducted by a psychologist with target groups according to the defined order and content of work. The involvement of social educators, social workers is possible.
4. ***Training***. The form of influence for developing ideas, beliefs, and standards of behaviour. It is advisable to conduct a narrow thematic training when women acquire some skills.
5. ***Lecture***. Clarification and coverage of questions related to shopaholism. It is advisable to have a comprehensive look at the question with the involvement of specialists of different fields: doctors, lawyers, psychologists, social workers, civil servants.
6. ***Video lecture***. Demonstration of video materials with corresponding comments in the form of a lecture by leading specialists related to the topic.
7. ***Conversation***. Individual and group forms of work with women involved in the implementation of the program. The content, time, and topics of the conversation are determined by the necessity to fulfill the tasks in the framework of the project.
8. ***Dispute***. The appropriate form of development of sustainable knowledge, ideas, beliefs, skills of women's behaviour; concerns the mechanisms of social and psychological protection, self-regulatory behaviour and basic standards of treatment in problem situations.

their views, respect the opinion of another. 7. Do not take all that is happening in the classroom beyond the group. 8. Carefully listen to the thoughts of others, do not interrupt. 9. Introduce a sign-regulator, for example, a raised hand, when all attention is drawn to the speaker. 10. Introduce a time limit that will restrict and set the scope of each lesson. 11. Ask participants to propose additional rules if they consider it necessary (Tokova, 2014).

Among all the forms and methods of group work, we emphasize the feasibility of conducting a training lesson to attract people with varying degrees of deviations (Parfanovych et al., 2018). The developed training lesson passed an expert evaluation and is recommended for implementation by the regional expert commission on the expertise of psychological and sociological tools (№ 3 of December 21, 2017) of Ternopil Regional Public Institute of Postgraduate Pedagogical Education.

Group forms and methods for preventing and treating shopaholism among females are developed on the basis of the results of the implementation of the developed training lesson (Parfanovych et al., 2018): 1. ***Exercise "Principles of work in a group"*** (Tokova, 2014). 2. ***Exercise "Draw Your Name"*** (Kireicheva and Kireichev, 2006). 3. ***Mini-lecture "Autoaggression, Addiction, Shopaholism"***. 4. ***Dispute "Unfinished sentence"***. 5. ***Examples of shopaholism*** (Tokova, 2014). 6. ***Dispute "Labels with Addictions"***. 7. ***Situation analysis***. 8. ***Exercise "Shopping"*** (Parfanovych et al., 2018). 9. ***Conversation***. 10. ***Exercise "Waterfall"***. 11. ***Discussion "My Values"***. 12. ***Exercise "Write a fairy tale"***. 13. ***Exercise "Free Advice"*** (Tokova, 2014). 14. ***Slide Show "Replacement of Shopping"***. 15. ***Reflection***.

Individual work is of particular importance in the corrective and rehabilitation process. The criteria for the effectiveness of individual work with a person are as follows: 1) *interests, needs*; 2) *state of health*; 3) *forthcoming plans, future prospects*; 4) *the nature of social relations*; 5) *way of spending free time*.

Prevention of shopaholism at an individual level includes the following *techniques for self-correction behaviour*: 1. On the days when you can buy something needless, take money only for your transport and lunch. 2. Find constant hobbies and reasonable entertainment, to include sports exercises or dance classes, aerobics, which contribute to the development of endorphin or a pleasure hormone, into the routine of a day. 3. Do not go shopping in a state of hunger or annoyance. 4. Switch over to other problems. 5. Count money spent (buying needless things, not necessary items). 6. Plan trips. 7. Communicate more with nice people. 8. Start learning a foreign language, take a pet, learn to do something with your own hands. 9. Think of the needy and get something for them. 10. Before each trip to the store, make a list of things you need to buy, and strictly follow this

list. 11. Take to stores only the amount of money that is enough to pay for what is on the list. 12. Do not carry a credit card on you. 13. If you saw the thing you would like to buy, put it aside for a few hours, and preferably for a day; maybe after a couple of hours it will seem to you not so much needed and important.

So, mass, group and individual work have their differences and specifics in application. The nature of the technology (prevention or coping) will be determined by the degree of deformation of the person's personal development. Such differentiation is presented in table 3.

4 DISCUSSION QUESTIONS

Unexpected and unpredictable moments in the research process require discussion.

1. Point 14 "Slide Show of "Shopping Substitutes" (presentation materials for aerobics, yoga, sports, charity activities, etc.) revealed that there are so many alternatives to shopping. Women and girls involved in work named many of their passions and hobbies. However, they also claimed that shopaholism is not an adikiya and has a socially accepted character, it can be a good way to spend free time. That is, the existing fact of conscious rejection of the problem – "departure" from it. Therefore, a lot of work should go into highlighting the consequences of deviation and increasing motivation to prevent and overcome the problem. And this, in turn, proves that prevention of shopaholism is very important and a priority.
2. It is worth highlighting the ***risks*** that may arise in the process of diagnosis and preventive work:
   - low motivation of a person to cooperate;
   - inconsistency of the person's psycho-emotional state, its dynamism;
   - manifestations of conformity, when the person pays more attention to the opinion of the environment than to the process of correcting the deviation;
   - unpreparedness of the subject of diagnosis and prevention and his inability to interpret the results of research and the process;
3. **Interpretation of research results**. The identified risks may negatively affect the effectiveness of the research.

   We have identified the following as criteria for the effectiveness of the work with the person: interests, needs; well-being; immediate plans, future prospects; the nature of social ties; way of spending free time. To determine reliable results, we offer a 5-point scale that will help you choose the right answer for a specific person:

(a) interests, needs (positive focus on development – 5 points; versatility of interests that are not fixed in stereotypes of behavior, possible manifestation of shopaholism in crisis situations – 4 points; interests do not have independent in-depth development, are manifested under the influence of other people, as well as manifestations shopaholism, – 3 points; periodic making of ill-considered purchases – 2 points; constant manifestations of shopaholism and lack of deeper interests – 1 point);

(b) feeling of well-being (balanced state, focus on positive communication and development – 5 points; state is balanced, but there is no positive setting – 4 points; there are periodic manifestations of psycho-emotional imbalance and the ability to impulsive acts, ill-considered actions – 3 points; ascertaining the presence of signs of negative well-being, increased anxiety, irritability, psycho-emotional excitability – 2 points; depressive state and manifestations of concomitant types of deviant behavior (smoking, alcohol abuse, etc.) – 1 point);

(c) immediate plans, future prospects (shopping is not included in the plans as an ill-considered purchase of things – 5 points; there are no plans and the person is guided by spontaneous decisions – 4 points; the probability of spending time in the form of shopping – 3 points; subconscious desire for shopping and unconsciousness of actions and their consequences – 2 points; an open desire to spend another unnecessary shopping trip – 1 point);

(d) the nature of social relationships (friends and the environment are free from addiction to buying unnecessary things – 5 points; uncertainty of the circle of acquaintances and friends – 4 points; possible spontaneous selection of shopping companions – 3 points; unconscious selection of friends with an addiction – 2 points; close friendship with persons who have similar addictive behavior – 1 point);

(e) way of spending free time (interests are diverse, aimed at development – 5 points; spending free time does not have clearly defined forms and landmarks – 4 points; the impossibility of shopping is limited by lack of funds and time – 3 points; shopping takes place if it is not in the form of buying, then at least contemplation, and at the same time you can borrow money if nec-

Table 3: Mass, group and individual measures to prevent and overcome shopaholism among women.

Activities	Forms and methods of implementation	Features carrying out	Nature (warning / overcoming)
Mass	Press conferences, round tables, psychocorrective classes, lectures, video lectures, conversations, debates	There is no specification regarding the object of influence. Orientation on the right choice of the way of spending free time, teaching positive forms of leisure	Warning
Group	Training sessions, exercises, lectures, debates, examples, discussions, analysis of situations, reflection, presentations	Individuals are "at risk" or the problem is closely related to a group of individuals. It can be both preventive and corrective and rehabilitative in nature	Warning / overcoming
Individual	Work of a psychologist, application of specialized methods, conversations, organization of self-education and self-control	Work is determined by the degree of socio-pedagogical neglect of a person and manifestations of oniomania as a type of deviant behavior. The person needs social support.	Overcoming

essary – 2 points; shopping – one of the priority ways of spending leisure time – 1 point).

Thus, the derived average score from the specified criteria will be evidence of the manifestation of oniomania, if the score is lower than 5 and 4. If the score is within 3, the person is in a risk group and needs appropriate correction in development; 1–2 points – work with the person should be carried out according to the type of "overcoming oniomania".

4. The variability of the approach to the prevention and overcoming of oniomania as a type of deviant behavior, which is dictated by the goal and the necessary result, as well as stages, forms and methods of work.

Additional research and analysis require such questions as: determining of clear functional obligations of institutions, establishments, organizations involved in the work, its financial, technical, material, methodological, scientific, personnel components; socio-organizational, scientific and methodical, normative and legal provision of preventive measures and solving of social and organizational issues of measures realization.

5 RESULTS

We have carried out a parametric measurement (comparison of data at the initial and final stages of work) in relation to persons involved in measures of mass, group and individual character. The results are presented on figure 1.

Referring the statistical data, such conclusions can be drawn: preventive and corrective and rehabilitation work with persons who have clearly expressed signs

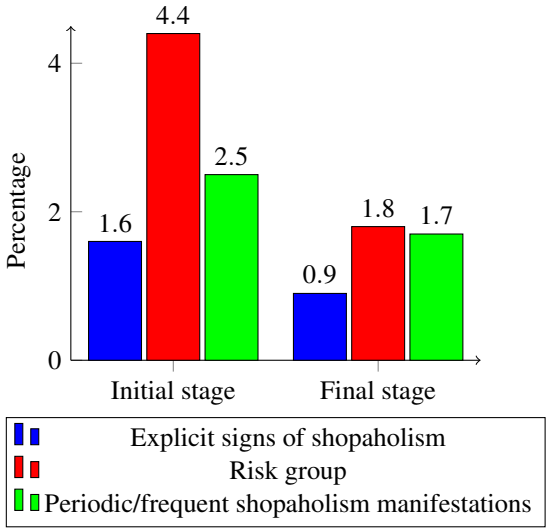


Figure 1: The change of the indicators of manifestation of shopaholism among women at the initial and final stages of preventive work.

of shopaholism is the most difficult to carry out; actualization of the problem positively influences people of the risk group; variables change the least among people who are characterized by periodic or partial manifestations.

Analysis of achieving the goal of the article. The purpose of the article is to establish the specifics of the prevention of shopaholism as a type of deviant behavior: the specifics of diagnosing shopaholism among student youth, effective ways of preventing this type of deviance in institutions of higher education. We believe that the goal of the article has been achieved. In the course of work, the following were discovered:

a) shopaholism (oniomania) is a deviant behavior, as it is a deviation in behavior, has a systemic and negative character;

b) the diagnosis of oniomania in the forces of multivector determinants is complex and must be based on various methods and forms and with the use of specialized techniques; a feature of diagnostics is that the deviation can be determined with the gradual application of diagnostic tools and with the involvement of specialists of various profiles;

c) in view of the fact that three groups of people have been identified with regard to the presence of oniomania (without deviations, a risk group, the presence of shopaholism), there should be a differentiation of the application of measures of a preventive and preventive nature, as well as measures aimed at overcoming an already existing problem (table 3); e) preventive measures at the general societal and individual levels in the activities of higher education institutions should also be excellent, taking into account the sex-gender approach.

6 CONCLUSIONS

In general, a person with a shopaholism problem should be taught not to hide from it, and to slowly and persistently solve it. This is ensured by: the work in accordance with the defined target groups and an individually differentiated approach as the basis for achieving the goals related to improving the socio-psychological state of those who are prone to shopaholism; monitoring of psychological and personality characteristics of persons prone to shopaholism; qualitative analysis of the implementation of preventive measures at mass, group, individual levels; expert assessment of the achieved results; scientific and methodical, socio-organizational, methodical, material and technical support of realization of diagnostic and preventive and correction measures.

Shopaholism in the article is defined as a social phenomenon and deviant behavior through the nature of manifestation, distribution, outcomes and significance in social and individual development. As a negative deviation, which first and foremost manifests itself in the behavior of an individual, shopaholism due to its mass manifestation has acquired a social character. This requires an in-depth study of the effective ways of preventing and overcoming it. Addressing this problem has allowed to highlight the main aspects that should be taken into account in the prevention of shopaholism.

1. The actuality of the problem and the coverage of the consequences of the formation of the addiction in mass measures is rather significant in the preventive maintenance of shopaholism. Primary prevention is known to be the most effective and addressing the problem itself helps to confirm its efficacy. Shopaholism or oniomania as a kind of deviant behavior is not realized by people, so the appeal to it is already a preventive step. Here, the rule that only a recognized pathology is defined as a problem works.
2. As the suppression, and, possibly, the complications of such risks as information oversaturation, deterioration of psycho-emotional state of health due to the lack of empathy, the spread of feelings of loneliness and alienation, pragmatism, rationalism are expected, and especially among women, the problem will acquire worse forms and complications. This is the first point. And secondly, preventive and correction and rehabilitation work on the problems of behavioral addicts should be approached comprehensively and treated not in isolation, but in relation to these problems in the state and well-being of a person.
3. There is a change in public values, when material values are propagated and moral and spiritual ones are somewhat devalued. Shopaholism is an obvious consequence of exaggeration of the material. Therefore, this deviation should be addressed not as a problem of behavioral disorders, but as a problem of morality and spirituality. The determinants of human development as a social being are social values, and hence the value benchmarks of each person.
4. Shopaholism or oniomania is an addiction. In general, any dependence should be prevented by the correct outlook of the world and treated through exclusion by positive behavioral skills. Therefore, it is necessary to actualize measures aimed at the formation of a healthy lifestyle, protection of the rights and interests of an individual. Work on general development, the direction of positive motives of the behavioral functioning of an individual eliminates the influence of negative and unpredictable factors of influence. This also implies the formation of skills for the correct exit from stressful situations, psychoemotional discharge, and the skills of positive relaxation.

Thus, shopaholism is a deviant behaviour, since it has the nature of deviations from normal behaviour with negative consequences for a person. It refers to the addictive, auto-aggressive kind of behavioural deviations. Conditions for effective implementation of the prevention and treating of shopaholism as a social phenomenon and the type of deviant behaviour

are: the development of diagnostic and preventive tools for prevention and corrective and rehabilitation work, a unified approach and recommendations for diagnostic, preventive and corrective and rehabilitation work; development of the program of activity; drawing up a clear plan of actions, defining the obligations, regulating the order of the of implementation of the planned measures and determining the conditions for the effective organization of the project implementation; scientific and methodological support of the work, formation of the scientific and methodological base of measures, establishment of peer review of the appropriate forms and methods of work.

REFERENCES

Callies, M. (2016). Of soundscapes, talkathons and shopaholics: On the status of a new type of formative in English (and beyond). *STUF - Language Typology and Universals*, (4):495–516. https://doi.org/10.1515/stuf-2016-0021.

Ghosh, S. (2013). Res Emptito Ergo Sum: Fashion and Commodity Fetishism in Sophie Kinsella's Confessions of a Shopaholic. *The Journal of Popular Culture*, 46(2):378–393. https://doi.org/10.1111/jpcu.12031.

Gust, S. (2015). Shopaholic to the Stars. *Library Journal*, 139(17).

Huei, L. Y., Ling, L. H., Ibrahim, N. I. B., Sarudin, M. T. B., Halim, N. H. B. A., Shahaidil, N. N. B. M., Permana, M. A. S., Ramekar, B. A., and Aradhya, B. N. (2023). Are You A Shopaholic? A Case Study of Customer Satisfaction of Shopee. *International Journal of Tourism and Hospitality in Asia Pasific*, 6(1). https://doi.org/10.32535/ijthap.v6i1.2198.

Hunter, K. M. B. (2018). Shopaholic stories: Tales of therapeutic addiction, governance, and political economy. *Journal of Consumer Culture*, 18(4):497–519. https://doi.org/10.1177/1469540516684186.

Jhang, F.-H. (2018). Changes in marital status and links to self-rated health: A study of temporal relationships. *The Social Science Journal*, 55(2):87–96. https://doi.org/10.1016/j.soscij.2017.08.001.

Kireicheva, S. V. and Kireichev, A. V. (2006). *Psykholohichnyi treninh rozvytku Ya-kontseptsii [Psychological training for the development of the I-concept]*. Yalta.

Kraepelin, E. (1915). *Psychiatrie: Ein Lehrbuch*. Verlag von Johann Ambrosius Barth, 8 edition.

Liu, C.-C. (2016). Understanding player behavior in online games: The role of gender. *Technological Forecasting and Social Change*, 111:265–274. https://doi.org/10.1016/j.techfore.2016.07.018.

Nechaenko, E. (2011). Istinnye prichiny shopogolizma kroyutsya v detstve [The true causes of shopaholism lie in childhood]. https://aif.ru/health/psychologic/23847.

Nechaenko, E. (2013). Ostorozhno: shopogolizm! Kak "lechit'sya" ot strasti k pokupkam [Caution: shopaholizm! How to "heal" from the passion for shopping]. https://aif.ru/health/psychologic/45661.

Noykina, D. (2012). Problema oniomanii v sovremennom obshchestve [The problem of onomania in modern society]. https://www.b17.ru/article/4143/.

Orel, A. N. (2004). Opredelenie sklonnosti k otklonyayuschemusya povedeniyu [Determination of the tendency to deviant behavior]. In Klejberg, Y. A., editor, *Socialnaya psihologiya deviantnogo povedeniya [Social psychology of deviant behavior]*, pages 141–154. Moskva.

Parfanovych, I. I., editor (2009). *Kompleks diahnostychnykh metodyk dlia vyznachennia determinant deviantnoi povedinky [A set of diagnostic techniques for determining determinants of deviant behavior]*. TNPU, Ternopil.

Parfanovych, I. I., Sukhozhak, I. T., and A., V. T. (2018). Diahnostyka i profilaktyka rozvytku shopoholizmu yak deviantnoi povedinky i simeinoi problem [Diagnosis and prevention of the development of shopogolism as a deviant behavior and family problem]. In Parfanovych, I. I., editor, *Diahnostyko-profilaktychnyi instrumentrii profilaktyky nasylstva sered molodykh simei [Diagnostic and preventive tools for the prevention of violence among young families]*. Vektor, Ternopil.

Popov, Y. V. and Brug, A. V. (2005). Addiktivnoe suicidal'noe povedenie podrostkov [Addictive suicidal behavior of adolescents]. *Obozrenie psihiatrii i medicinskoj psihologii*, (1):24–26. https://elibrary.ru/item.asp?id=37711801.

Romanchukevich, T. (2013). Simptomatika i prichiny shopogolizma [Symptomatics and causes of shopologolism]. https://www.terrawoman.ua/psychology/psychology_news/simptomatika_i_prichiny_shopogolizma.

Sharma, R., Tyagi, P., Singh, U., Khatter, A., Sharma, A., and Kumar, K. (2020). Exploring shopaholics attitude and behaviors: A dose, defense, ordisorder? *Indian Journal of Health Social Work*, 2(2):54–57. https://www.researchgate.net/publication/350277077.

Shopogolizm (2015). Shopogolizm [Shopaholicism]. https://my-health.ru/content/63-shopogolizm.

Tokova, Y. O. (2014). *Diahnostyka i profilaktyka oniomanii sered osib zhinochoi statti u diialnosti sotsialnoho pratsivnyka [Diagnosis and prophylaxis of oniomania among female subjects in the activities of a social worker]*. TNPU, Ternopil.

Tyagi, P. and Shyam, R. (2019). Shopaholism from a psychological perspective. *IARHW International Journal of Social Sciences Review*, 7(5-11):1379–1381. https://www.researchgate.net/publication/342331224.

UkrLoves.com (2017). Autoahresiia [Autoaggression]. https://ukrloves.com/zdorov-ja/13960-autoagresija.html.

Yuh, J. and Choi, S. (2017). Sources of social support, job satisfaction, and quality of life among childcare teachers. *The Social Science Journal*, 54(4):450–457. https://doi.org/10.1016/j.soscij.2017.08.002.

Inquiry-Based Learning in the Study of Chemical Disciplines by Food Technologies Students

Olha Hulai[1][a], Iryna Moroz[1][b] and Vasylyna Shemet[1][c]
[1]*Lutsk National Technical University, Lvivska 75, Lutsk, 43018, Ukraine*
o.hulai@lntu.edu.ua, moroz.iryna1@gmail.com, v.shemet@lntu.edu.ua

Keywords: Inquiry Based Learning, Science Learning, Teaching.

Abstract: Inquiry-based learning, IBL is analyzed as an educational strategy in which students use research methods and practices It is noted that the advantages of IBL are the development of curiosity and critical thinking, as well as active, conscious and deep learning. The method of conducting laboratory classes in biochemistry for students of specialty 181 Food technologies is given. The purpose of the research project "Milk" is to provide a comprehensive biochemical assessment of milk as a valuable food product and to establish criteria for assessing its quality. The application of the IBL strategy allows you to catch up, deepen, expand and combine competencies in the main chemical disciplines. The implementation of IBL requires significant methodological efforts on the part of the teacher and a certain level of research skills and abilities of students. Therefore, it is obvious that this technique will be effective in the final classes of disciplines or in integrated courses. The development of thinking strategies, which are the essence of research practice, will be extremely useful in the performance of qualification work.

1 INTRODUCTION

New strategies and approaches to teaching with an emphasis on the use of multi-media resources are a trend in modern pedagogy. Since the middle of the twentieth century, the leading role in the study of natural sciences has been occupied by laboratory (practical) work. This involves direct interaction with equipment or materials, individually or in small groups, and includes observation and/or manipulation related to practical activities as well. Today, the method of conducting a lesson through the reproduction of a typical instruction by a student is becoming a thing of the past. The search and implementation of innovative methods and techniques in the educational process is relevant (Hulai and Kabak, 2022; Karnishyna et al., 2022; Oliveira and Bonito, 2023).

Based on a systematic review of the literature, Oliveira and Bonito (2023) state that the concept of a laboratory (practical) lesson often includes three big ideas: it should be an integrator of the manipulation of materials in practice; to develop competencies related to scientific processes aimed at a better understanding of the nature of science; to mobilize scientific knowledge in accordance with an approach aimed at awareness.

Inquiry-based learning, IBL is an educational strategy in which students use methods and practices similar to those used by professional scholars to acquire new knowledge. It can be defined as the process of discovering new cause-and-effect relationships, where the student formulates hypotheses and tests them through experimentation and/or observation (Pedaste et al., 2012). It is worth noting that the IBL is focused on students: what is new knowledge to them is not, in most cases, new knowledge to the world, even though scientists can flexibly use this approach in their discoveries of new knowledge (Pedaste et al., 2015). The method is used in teaching mathematics (both in high school and at university) (Cushman et al., 2023; Ernst et al., 2017), physics (Xaba and Sondlo, 2023), biology (Chen et al., 2023; Majidova, 2023), natural science (Camci and Büyüksahin, 2023), chemistry (Camci and Büyüksahin, 2023; Finn and Bradley, 2023; Ochs et al., 2023), foreign language (Lee, 2014), electronic technology (Hussain et al., 2023). Note the effectiveness of the application of IBL strategies in legal (Greenfield and Niemczyk, 2023) and medical (Finn and Bradley, 2023) education.

[a] https://orcid.org/0000-0002-1120-6165
[b] https://orcid.org/0000-0001-9167-4876
[c] https://orcid.org/0000-0001-8952-5097

Hulai, O., Moroz, I. and Shemet, V.
Inquiry-Based Learning in the Study of Chemical Disciplines by Food Technologies Students.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 107-113
ISBN: 978-989-758-579-1

Inquiry-based learning involves an intelligent challenge (Zohar, 2023). It develops curiosity and involves active, aware thinking, and deep learning related to issues of interest to students. Studies of foreign educators prove the benefits of Inquiry-Based Learning strategies to increase the level of emotional intelligence and psychological health of students (Sharma et al., 2023). Maharani et al. (2023) state the effectiveness of IBL tools for improving critical thinking skills. Paidi et al. (2023) effectively apply it in the study of biology to improve creative thinking skills and independent learning.

There are 4 main IBL techniques (Guido, 2017), which are perfectly illustrated by figure 1:

1. **Confirmation Inquiry.** The teacher gives students a question, the answer to it, and how to get that answer. Their goal is to develop research and critical thinking skills by learning how a particular method works.
2. **Structured Inquiry.** The teacher asks the students an open-ended question and suggests a research method. They should use this method to draw a conclusion supported by evidence.
3. **Guided Inquiry.** The teacher gives the students an open-ended question. Usually, in groups, they develop research methods to reach a conclusion.
4. **Open Inquiry.** The teacher only offers direction and provides students their own support. They ask original questions that they explore using their own methods and ultimately present their results for discussion and expansion.

IBL strategies are also not without some shortcomings and difficulties in implementation. With mass use, they can become superficial and formalized (Zohar, 2023). It's understandable that students who don't have the necessary thinking strategies and aren't used to applying them in their regular learning won't suddenly start using them when they switch to IBL. That is why, in our opinion, it is expedient to use this technology in the practice of university education.

The *aim* of the article is to demonstrate the practice of applying the IBL method in the educational process of Lutsk National Technical University on the example of conducting laboratory classes in biochemistry for bachelors in the specialty 181 Food Technologies.

2 METHODS

Based on the analysis of literary sources for implementation in the educational process, we chose the IBL structure described in the work (Pedaste et al., 2015). It includes five general stages: Orientation, Conceptualization, Investigation, Conclusion (Outcome), and Discussion (figure 2) and is non-linear in nature. The content and expected outcome of each stage are shown in table 1.

With the help of the arrows, three possible IBL trajectories can be traced (Pedaste et al., 2015):

(a) Orientation – Questioning – Exploration (the ability to return to the Questioning in a loop) –Data Interpretation – Conclusion;

(b) Orientation – Hypothesis Generation – Experimentation – Data Interpretation –Hypothesis Generation – Experimentation (the ability to return to the Hypothesis Generation in a loop) – Data Interpretation – Conclusion;

(c) Orientation – Questioning – Hypothesis Generation – Exploration – Experimentation – Data Interpretation – Conclusion.

All stages are united by discussion in different formats (student – teacher, student – student, group of students).

On the basis of this model, a methodology was developed and separate laboratory classes in the discipline "Biochemistry" were conducted for students of the specialty 181 Food Technologies of Lutsk National Technical University.

3 RESULTS

The educational program of the specialty 181 Food Technologies contains 5 disciplines of the chemical cycle, which are closely related, logically structured and aimed at forming the basis of professional competences. The IBL strategy is very well suited to the final topics of the course, dedicated to the chemical characteristics of certain types of food raw materials and products. Examples of the application of Inquiry-Based Learning in a workshop on chemical disciplines is shown in table 2.

Teaching biochemistry (a discipline that completes the cycle of studying the chemical foundations of food production) is based on the basic concepts and skills acquired in the mastery of general, inorganic and organic chemistry. In the laboratory practicum, the skills acquired in the classes in physical, colloidal and analytical chemistry are improved (Hulai et al., 2023).

Let's consider in detail the methodology of conducting a laboratory lesson on the topic "Milk" using IBL technology. The purpose of the study is to give a comprehensive biochemical assessment of milk as

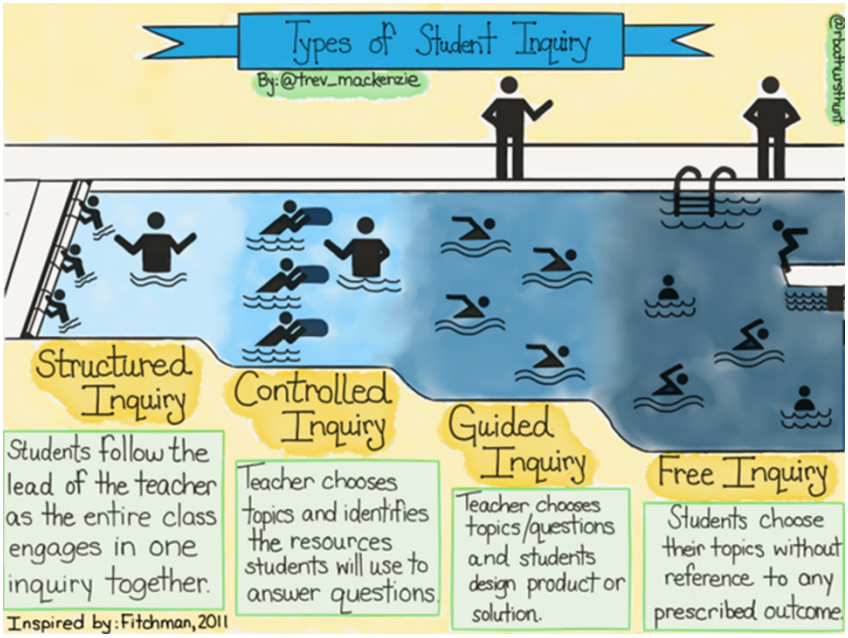


Figure 1: Basic techniques IBL (thinkingpathwayz.weebly.com, 2021)

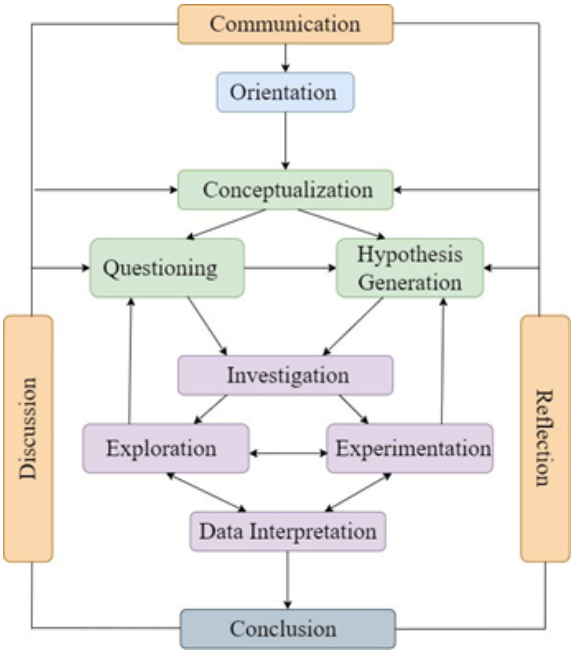


Figure 2: Inquiry-Based Learning Framework (based on Pedaste et al.) (Pedaste et al., 2015)

a valuable food product and to establish criteria for assessing its quality. In addition, students have the opportunity to catch up, deepen, expand and combine competencies in the main chemical disciplines.

Stage 1. Orientation. The teacher begins the lesson with a short discussion about milk as an object of study. The value of milk is due to the fact that it contains more than 200 different chemical compounds. The composition of milk includes all the substances necessary for the full functioning of the body: proteins, fats, carbohydrates, mineral salts, vitamins. These components of milk are well balanced, making them easy and completely digestible.

From a chemical point of view, milk is a polydisperse system that includes substances that are in different states: ionic-molecular (lactose, most mineral salts), colloidal (calcium phosphate, proteins) and coarsely dispersed (fats).

Stage 2. Conceptualization. It is clear that milk from different manufacturers and different degrees of freshness will differ in composition and properties of the pit. Therefore, students choose several samples of milk for comparison, for example, store-bought, farm and homemade. Divided into teams of 2-3 people, they determine the main research question (for example, how to establish the freshness of milk, its energy value, adulterated milk, macro- and micronutrients, etc.), find the necessary indicators from reference literature and Internet sources.

Stage 3. Investigation. Each team chooses methods (taking into account the possibility of using available laboratory equipment), draws up a research plan, prepares the necessary reagents and adjusts the devices. At this stage, the help of a teacher, as well as a qualified laboratory assistant, is especially important. Here are examples of experiments conducted by students.

To generalize and deepen knowledge of inorganic

Table 1: Content of Inquiry-Based Learning stages.

Stage	Definition	Result
Orientation	The process of stimulating interest in the topic and encouraging the solution of the learning problem.	Establishing the basic parameters of the subject area and formulating the problem.
Conceptualization	The process of asking theoretical questions and generating hypotheses regarding the stated problem	Formulation of research questions or hypothesis to be tested.
Investigation	The process of planning a search or experiment, conducting experiments, collecting and analyzing data based on the experiment design.	Interpretation of data (formulation of relationships between variables) that will allow you to return to the original research question or hypothesis and conclude on the assumption. Gaining new knowledge and forming skills and abilities.
Conclusion	The process of creating insights from data. Comparing conclusions drawn from data with hypotheses or research questions.	Final conclusion on the results of the study, answers to research questions or hypotheses.
Discussion	The process of discussing and presenting the results of each stage or the entire research to others (students, teachers) and gathering feed-back from them.	Reflection and discussion about the success and failure of the process, identifying ways to improve it and new inquiry for the next research cycle.

Table 2: Examples of the application of Inquiry-Based Learning in a workshop on chemical disciplines.

Discipline	Topic	Aim of the lesson
Inorganic Chemistry	Inorganic substances as food additives.	To investigate the properties of inorganic substances used as food additives, to study the principles of their labeling, to assess the potential impact on the human body.
Organic Chemistry	Food organic acids.	To study common food acids, to determine their content in food, to synthesize in laboratory conditions, to investigate resistance to aggressive factors.
Analytical Chemistry	Water quality.	To analyze the criteria for the quality of drinking and technical water, to determine the hardness of water of different origins, to study the effect of heat treatment, to establish the features of different types of mineral water.
Physical and Colloid Chemistry	Properties of emulsions.	To consider the types of emulsions and their application in food technology, to establish the physical parameters of the stability of emulsions (cocktails, sauces, etc.), to deter-mine the effect of stabilizers and emulsifiers.
Biochemistry	Milk.	To study milk as a biochemical object and the most important food product, to establish criteria for milk quality, the content of the main macronutrients in milk from various sources.

and physical chemistry, students can investigate the physicochemical properties of milk, in particular its density and freezing point. The density of milk is determined using a hydrometer. The density of milk varies from 1.026 to 1.032 g/cm^3. The density of skimmed milk is slightly higher than that of whole milk and can range from 1.033 to 1.038 g/cm^3. By the value of the density, it is easy to establish the adulteration of milk by dilution with water. Adding 10% water to milk will reduce its density by 0.003 g/cm^3.

The freezing point of milk is lower than the freezing point of water and ranges from -0.54 to -0.57 °C. The freezing point of natural milk is a constant value and this indicator can be used to determine its naturalness. The freezing point of milk is determined by the cryoscopic method using a Beckman thermometer. Every 1.8% of the added water lowers the freezing point by 0.01°C.

The study of milk as a colloidal system containing fat globules, casein micelles and whey proteins dispersed in an aqueous solution will allow a deeper understanding of the properties and behavior of colloids. In addition, the colloidal chemical properties of milk are the basis of many food processing technologies, such as cheese and yogurt. During the project, students investigate the coagulation of milk proteins under the action of acetic acid and acetone solutions of different concentrations. The acetone test is also a

test for the freshness of milk, since milk proteins will only precipitate with an increase in the concentration of acids in the milk.

The acquired competencies in analytical chemistry are most used at this stage. The task of this discipline is not only to form students' knowledge of the theoretical foundations of the analysis of the composition of substances and compounds, but also to apply the acquired knowledge and skills of qualitative and quantitative analysis in professional activities, in particular to assess and control the quality of food raw materials. Therefore, first of all, we offer students to control the quality of milk for the content of inorganic preservatives, in particular, to investigate the qualitative content of hydrogen peroxide, chlorine and soda.

Determinations of hydrogen peroxide and chlorine are based on redox reactions of interaction with a starch solution of potassium iodide in an acidic environment. Molecular iodine, which is formed as a result of this interaction, gives starch a blue color. Soda in milk is detected by adding a 0.2% alcohol solution of rosoliic acid to it. The presence of soda is determined by the crimson-red color of milk. This task deepens the competence not only in analytical chemistry, but also in inorganic chemistry, since students need to make an equation for the redox interaction of hydrogen peroxide and chlorine with potassium iodide, select the coefficients by the redox balance method.

Determining the acidity of milk is an important aspect of controlling its quality and safety. High levels of acidity in milk can indicate that the milk is spoiled, and increased acidity in milk can affect its taste, texture, and nutritional value. Students use knowledge and skills in analytical chemistry, including using the acid-base titration method to establish the acidity of milk.

One of the teams conducts a biochemical analysis of milk, determining the content of carbohydrates (usually milk contains lactose, so it is interesting to check lactose-free milk), proteins (in particular, caseins) and fats.

Stage 4. Conclusion. At the end of the experiments, each team processes the results, evaluates the obtained indicators and compares them with the initial hypotheses. Draw up a report and prepare presentation materials.

Stage 5. Discussion. The class begins with introductory communication at the first stage, individual and group discussions, clarification of critical points at stages 2-4 and the final discussion. Since each team worked relatively autonomously, researching its own issue regarding the quality and properties of milk, the final discussion of the results is very important. Students demonstrate the results of experiments, methods and tools that they used to get answers to the questions posed, compare the results obtained by different methods.

The final element is reflection – answers to several questions about the lesson and your own achievements (questionnaire on the discipline page on the Moodle platform). It is important to analyze failed experiments or questionable results.

According to the results of a survey of students (20 2nd year students majoring in 181 Food Technologies of Lutsk National Technical University, 2022/2023 academic year), a positive response to the implemented methodology was established. Thus, 90% of respondents noted that they were interested in the lesson, 75% had to recall information from previously covered subjects, 85% learned about new facts and methods. Students identified the positive factors of the IBL methodology: dynamism, "never to be bored" (95%), the advantages of teamwork (80%), the ability to choose one's own research trajectory (65%), professional direction (75%), and the need to think hard (55%). However, 25% of students indicated that this method is too difficult for them compared to performing laboratory work according to the instructions.

4 CONCLUSIONS

Inquiry-based learning, implemented at the laboratory lesson in biochemistry, was positively assessed by both students and teachers of LNTU (low representativeness of the sample is associated with a small number of students in this specialty). It is worth noting that the use of the IBL method involves careful planning of the scenario and requires more time than traditional laboratory work according to the instructions. In particular, the methodological development described above was implemented during two 90-minute sessions, and the final discussion on the results was held in a separate lesson. We agree with the opinion (Pedaste et al., 2012; Zohar, 2023) that learning strategies that engage students in scientific research that involve active thinking have a positive impact on the understanding of scientific concepts compared to instructional strategies that rely primarily on passive learning.

Focusing on the development of students' research skills makes practical work more effective. IBL strategies aim to complement the traditional manipulation of physical objects with the search for scientific ideas and data analysis. The application of IBL requires significant methodological efforts on the part of the teacher and a certain level of research skills and

abilities of students. Therefore, we come to the conclusion that this methodology will be effective in the final classes of disciplines, or in integrated courses. The development of thinking strategies, which are the essence of research practice, will be extremely useful in the performance of qualification works.

One of the problems we faced in the application of IBL was the assessment of students' educational achievements. In the assessment, we tried to take into account elements (Oliveira and Bonito, 2023) such as general settings, physical context, the relationship between skills and knowledge, and how realistic and interesting the task is for students. However, it is quite difficult to assess the cognitive and practical results of each student's work. The methodology and evaluation criteria require further separate consideration. An evaluation system needs to be substantiated, the structure of which includes a set of strategies and tools specifically designed to allow the evaluation of a specific stage of practical work. This will be the subject of our further research and methodological development.

REFERENCES

Camci, H. and Büyüksahin, Y. (2023). Teachers' Views on the Effects of Inquiry-Based Science Education on the Learning Process of Bilingual Students. *Journal of Teacher Education and Lifelong Learning*, 5(1):413–428. https://doi.org/10.51535/tell.1310271.

Chen, H.-C., Gijlers, H., Sui, C.-J., and Chang, C.-Y. (2023). Asian Students' Cultural Orientation and Computer Self-Efficacy Significantly Related to Online Inquiry-Based Learning Outcomes on the Go-Lab Platform. *Journal of Science Education and Technology*, 32(5):743–758. https://doi.org/10.1007/s10956-023-10058-9.

Cushman, J., Donaldson, B., Dow, K., Gantner, R., George, C. Y., and Jaco, W. (2023). Merging Inquiry and Math Teachers' Circles: The Math Circles of Inquiry Project. *Notices of the AMS*, 70(6):963–966. https://www.ams.org/journals/notices/202306/rnoti-p963.pdf?adat=June/July%202023&trk=2723&cat=education&galt=none.

Ernst, D. C., Hodge, A., and Yoshinobu, S. (2017). What Is Inquiry-Based Learning? *Notices of the AMS*, 64(6):570–574. https://doi.org/10.1090/noti1536.

Finn, J. and Bradley, L. (2023). vSim® gerontology and inquiry-based learning enhancing clinical reasoning and preparation for practice. *Teaching and Learning in Nursing*. https://doi.org/10.1016/j.teln.2023.05.002.

Greenfield, S. and Niemczyk, E. (2023). Adopting a Soft Transdisciplinary Approach via Inquiry/Project Based Learning: A Focus on Legal Education. *Space and Culture, India*, 11(1):27–40. https://doi.org/10.20896/saci.v11i1.1350.

Guido, M. (2017). What Is Inquiry-Based Learning: 7 Benefits & Strategies You Need to Know. https://www.prodigygame.com/main-en/blog/inquiry-based-learning-definition-benefits-strategies/.

Hulai, O. and Kabak, V. (2022). Google Digital Tools as a Means of Improving the Educational Process at Higher Education Institutions. *The Scientific Issues of Ternopil Volodymyr Hnatiuk National Pedagogical University. Series: Pedagogy*, 1(2):14–23. https://doi.org/10.25128/2415-3605.22.2.2.

Hulai, O., Moroz, I., and Shemet, V. (2023). The Concept of Teaching Chemical Disciplines for Future Food Technologists. *Scientific Notes of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University. Section: Theory and Methods of Teaching Natural Sciences*, 4:117–124. https://doi.org/10.31652/2786-5754-2023-4-117-124.

Hussain, M. M. A., Zainuri, A. N., Zulkifli, M. R., and Rahman, A. A. (2023). Effect of an Inquiry-Based Blended Learning Module on Electronics Technology Students' Academic Achievement. *Journal of Technical Education and Training*, 15(2):21–32. https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/11871.

Karnishyna, D. A., Selivanova, T. V., Nechypurenko, P. P., Starova, T. V., and Stoliarenko, V. G. (2022). The use of augmented reality in chemistry lessons in the study of "Oxygen-containing organic compounds" using the mobile application Blippar. *Journal of Physics: Conference Series*, 2288(1):012018. https://doi.org/10.1088/1742-6596/2288/1/012018.

Lee, H.-Y. (2014). Inquiry-based Teaching in Second and Foreign Language Pedagogy. *Journal of Language Teaching and Research*, 5(6):1236–1244. https://doi.org/10.4304/jltr.5.6.1236-1244.

Maharani, N. I., Dasna, I. W., and Utama, C. (2023). The Effectiveness of Inquiry-Based Learning Instrument to Enhance Student's Critical Thinking Skills. *Madrasah: Jurnal Pendidikan dan Pembelajaran Dasar*, 15(2):66–77. https://doi.org/10.18860/mad.v15i2.18682.

Majidova, M. P. (2023). Enhancing Biology Education: Effective Methods for Utilizing Laboratory Classes. *Journal of Pedagogical Inventions and Practices*, 21:10–14. https://www.zienjournals.com/index.php/jpip/article/view/4070.

Ochs, A. M., Dee, J. M., Arnold, A. M., Barber, K. A., and Zovinka, E. P. (2023). Connecting Active Artwork to Chemistry: Leading Students in Inquiry-Based Learning of Density and Viscosity. *Journal of Chemical Education*, 100(9):3703–3708. https://doi.org/10.1021/acs.jchemed.3c00277.

Oliveira, H. and Bonito, J. (2023). Practical work in science education: a systematic literature review. *Frontiers in Education*, 8. https://doi.org/10.3389/feduc.2023.1151641.

Paidi, Anazifa, R. D., and Pratama, A. T. (2023). The effectiveness of free inquiry-based learning integrated with deep source usage on students' critical, creative thinking and self-directed learning skills. *AIP Con-*

ference Proceedings, 2614(1):020013. https://doi.org/10.1063/5.0126638.

Pedaste, M., Mäeots, M., Leijen, A., and Sarapuu, T. (2012). Improving students' inquiry skills through reflection and self-regulation scaffolds. *Technology, Instruction, Cognition and Learning*, 9(1-2):81–95. https://eric.ed.gov/?id=EJ1258250.

Pedaste, M., Mäeots, M., Siiman, L. A., de Jong, T., van Riesen, S. A. N., Kamp, E. T., Manoli, C. C., Zacharia, Z. C., and Tsourlidaki, E. (2015). Phases of inquiry-based learning: Definitions and the inquiry cycle. *Educational Research Review*, 14:47–61. https://doi.org/10.1016/j.edurev.2015.02.003.

Sharma, P. K., Kumar, S. H., and Verma, M. (2023). The Psychological Influence of Inquiry-Based Learning on Students' Emotional Intel-ligence and Well-Being in Education. *Journal for ReAttach Therapy and Developmental Diversities*, 6(7s):173–178. https://jrtdd.com/index.php/journal/article/view/780.

thinkingpathwayz.weebly.com (2021). Inquiry-Based Learning.

Xaba, N. and Sondlo, A. (2023). Applying Inquiry-Based Learning into Practice: A Case Study of One Rural South Af-rican Physical Sciences Teacher. In *Education Applications & Developments: VIII Advances in Education and Education-al Trends Series*, pages 505–516. Science Press. https://www.researchgate.net/publication/371831252.

Zohar, A. (2023). It's Not All or Nothing: System-Wide Implementation of Inquiry-Based Teaching and Learning. In *Scaling-up Higher Order Thinking: Demonstrating a Paradigm for Deep Educational Change*, pages 91–110, Cham. Springer International Publishing. https://doi.org/10.1007/978-3-031-15967-1_5.

Approaches to the Blended Learning Organisation

Iryna S. Mintii[1,2,3,4,5][a]

[1]*Institute for Digitalisation of Education of the NAES of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine*

[2]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[3]*Lviv Polytechnic National University, 12 Stepana Bandery Str., Lviv, 79000, Ukraine*

[4]*Zhytomyr Polytechnic State University, 103 Chudnivsyka Str., Zhytomyr, 10005, Ukraine*

[5]*Academy of Cognitive and Natural Sciences, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

mintii@acnsci.org

Keywords: Blended Learning, Blended Learning Organization, Teacher Education, Teacher Training, Teacher Retraining.

Abstract: The relevance of research on blended learning (BL) has increased significantly during and after the COVID-19 quarantine. Particular attention should be paid to teachers' training and retraining to conduct BL classes. The study aims to analyze scientific sources from the Scopus database systematically on the BL utilization in teacher training and retraining during the onset and progression of the COVID-19 pandemic. The final sample consisted of 27 sources. By analyzing studies, the following leading approaches to BL organization were identified: by the combination method (in particular, a pre-planned combining of face-to-face, synchronous and asynchronous distance learning through BL design and emergency transition from full-time to distance learning; combining of full-time and part-time forms of learning, learning on weekdays and weekends; on-campus and distance learning, etc.), by ICT tools (in particular, application LMS; institutional training in open courses posted on MOOC platforms; application of software and hardware for BL implementation); by pedagogical technologies BL (effective communication, interaction, and collaboration in the BL environment; teacher-led group and individual reflection on students' experience of using BL tools in their own lessons; students' work in small groups; project approach; mobile learning, in particular, on-demand learning; gamification in learning). The identified approaches to BL organization provide a number of advantages, including personalization; improved access to resources; intellectualization of learning. However, BL is not without its weaknesses, including dependence on technology; technical difficulties, and the need to train both teachers and students.

1 INTRODUCTION

The first studies on the introduction of blended learning (BL) in education date back to the beginning of the twenty-first century and the full-scale introduction of BL in education was organised in 2020 due to the need for social distancing caused by the COVID-19 pandemic (Kovalchuk et al., 2023). Even before the pandemic, researchers voiced numerous arguments in favour of using BL, including, for example, meeting the needs of learning in small remote and isolated areas where there are not enough students (of the same speciality) to form a group or there is no teacher or training centre, it is not possible to implement traditional – face-to-face – study programmes, to cover hard-to-reach areas (e.g., small islands, mountainous areas), as well as in case of lack of educational facilities (Zagouras et al., 2022, p. 12944). It is also noted in (Asghar et al., 2022, p. 1) that "BL approaches are considered as the most viable for the delivery of training to remote areas and accessing learners at a mass level", and that "students who cannot maintain regular traditional schools . . . with severe health issues . . . and students in long-term incarceration" (Asghar et al., 2022, p. 2). An important addition to the above is that BL promotes "continuity of the education during the COVID-19 crisis and even in war situations like Ukraine, Yemen" (Iyer et al., 2023, p. 43).

Scholars have consistently emphasised the relevance of research on the practical implementation of BL, as "a review of empirical research on BL can help stimulate thinking about effective strategies for designing and implementing BL teacher education programmes" (Keengwe and Kang, 2013, p. 480), but despite the numerous studies, "there are still limited studies concerning the implementation of BL"

[a] https://orcid.org/0000-0003-3586-4311

Mintii, I.
Approaches to the Blended Learning Organisation.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 114-121
ISBN: 978-989-758-579-1

(Zagouras et al., 2022, p. 12942). One of the important factors influencing the effective implementation of BL approaches is the competence of teachers, so the issue of their BL and readiness to implement it needs to be studied first.

The purpose of the study is to systematically analyse scientific sources on the use of BL in teacher training and retraining at the beginning and during the development of the COVID-19 pandemic.

2 RESEARCH METHODOLOGY

The scientometric database Scopus was used to obtain a sample of publications. Since the goal is to analyse scientific sources on the use of BL for teacher training, a preliminary selection was made on 11.01.2023 using the search query: `(TITLE-ABS-KEY ("blended learning") AND TITLE-ABS-KEY ("teacher education" OR "teacher training"))`. The query resulted in 397 sources. The chronological boundaries of the study, defined according to the objective as 01.01.2020 – 11.01.2023, allowed us to reduce the number of selected sources to 130. The need to get acquainted with the content of the sources led to a reduction in the sample by removing sources that were not publicly available. The final sample consisted of 27 sources: (Ridwan et al., 2020; Joseph and Trinick, 2021; Abaci et al., 2021; Zagouras et al., 2022; Asghar et al., 2022; Jiang et al., 2022; Jen and Hoogeveen, 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Calderón et al., 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022; Sutiah et al., 2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Glietenberg et al., 2022; Le and Pham, 2021; Yan and Chen, 2021; Bozkurt, 2022; Short et al., 2021).

The analysis of the sample made it possible to identify the main areas of research (figure 1): a reflective review of own experience of implementing BL (Ridwan et al., 2020; Joseph and Trinick, 2021; Abaci et al., 2021), quantitative and qualitative analyses of certain aspects of BL implementation (Zagouras et al., 2022; Asghar et al., 2022; Jiang et al., 2022; Jen and Hoogeveen, 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Calderón et al., 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022; Sutiah et al., 2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Glietenberg et al., 2022; Le and Pham, 2021), and systematic reviews on the subject (Yan and Chen, 2021; Bozkurt, 2022; Short et al., 2021).

On the other hand, we can identify studies that have been conducted with both future teachers (Jiang et al., 2022; Meulenbroeks, 2020; Lorenza and Carter, 2021; Vielma Puente and Ruano, 2021; Theelen et al., 2020; Garcia-Ponce and Mora-Pablo, 2020; Harangus et al., 2021; Almendingen et al., 2021; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Sutiah et al., 2020; Alsina Tarrés et al., 2022; Herliana et al., 2021; Jenkins and Crawford, 2021; Joseph and Trinick, 2021; Le and Pham, 2021) and practitioners (Zagouras et al., 2022; Asghar et al., 2022; Bruggeman et al., 2022; Jen and Hoogeveen, 2022; Calderón et al., 2021; Salonen et al., 2021; Abaci et al., 2021; Glietenberg et al., 2022).

The research geography covers Europe (Greece (Zagouras et al., 2022), Romania (Harangus et al., 2021), Netherlands (Meulenbroeks, 2020; Theelen et al., 2020), Croatia, Malta, Germany, Portugal, and Norway (Jen and Hoogeveen, 2022; Almendingen et al., 2021), France (Lami et al., 2021), Spain, the United Kingdom (Alsina Tarrés et al., 2022; Abaci et al., 2021), Belgium (Bruggeman et al., 2022), Finland (Salonen et al., 2021), and Turkey (Şentürk, 2021; Kemaloglu Er and Bayyurt, 2022)), Asia (Hong Kong (Jen and Hoogeveen, 2022), Pakistan (Asghar et al., 2022), China (Jiang et al., 2022), Indonesia (Sumarni et al., 2021; Ridwan et al., 2020; Sutiah et al., 2020; Herliana et al., 2021), Vietnam (Le and Pham, 2021)), Australia (Lorenza and Carter, 2021; Jenkins and Crawford, 2021; Joseph and Trinick, 2021), South America (Ecuador (Vielma Puente and Ruano, 2021), Mexico (Garcia-Ponce and Mora-Pablo, 2020)), Africa (Ethiopia (Mihret et al., 2022), South Africa (Glietenberg et al., 2022)) (figure 2).

Research topics include (figure 3):

- *BL in teacher training*:
  - BL organization for future teachers (Vielma Puente and Ruano, 2021; Le and Pham, 2021; Bruggeman et al., 2022), in particular during the COVID-19 pandemic (Sutiah et al., 2020; Herliana et al., 2021; Joseph and Trinick, 2021);
  - the impact of BL on the academic achievements of future teachers, in particular aspects of self-regulation of learning activities (Jiang et al., 2022), online activity (Salonen et al., 2021), and the development of 21st-century skills (Şentürk, 2021);

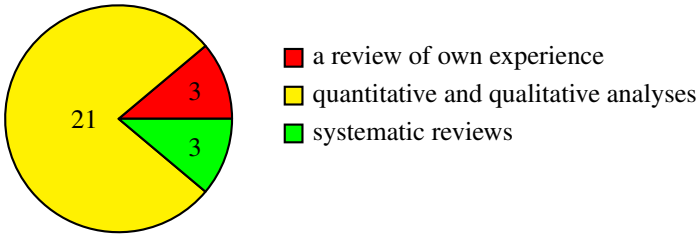


Figure 1: Distribution of sources by research area.

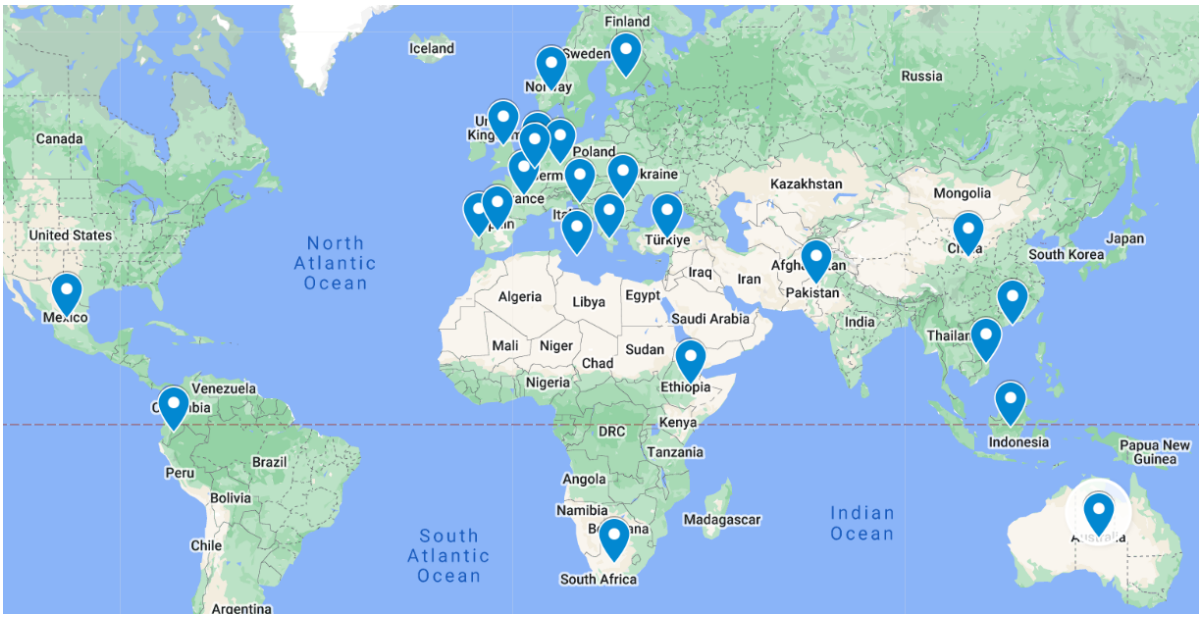


Figure 2: Research geography.

  - academic mobility of future teachers in the BL context (Theelen et al., 2020; Alsina Tarrés et al., 2022);
  - BL in the formation of future teachers' professional competencies, including general (Almendingen et al., 2021) and methodological ones (Short et al., 2021; Harangus et al., 2021; Sumarni et al., 2021);
  - BL in the training of subjects teachers: physical education and primary school (Calderón et al., 2021), English (Garcia-Ponce and Mora-Pablo, 2020; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022), physics (Mihret et al., 2022), music (Jenkins and Crawford, 2021);
- *BL in teacher retraining*: for teaching gifted children (Jen and Hoogeveen, 2022) and using digital technologies in formal (Zagouras et al., 2022) and non-formal education (Abaci et al., 2021);
- *BL in teacher training and retraining*: determining the balance of BL parts (Asghar et al., 2022), analyzing the organization of emergency BL in the context of COVID-19 (Meulenbroeks, 2020; Lorenza and Carter, 2021; Glietenberg et al., 2022).

3 RESULTS

While the studies of previous years focused more on the conceptual and theoretical foundations of BL, in particular, the definition of BL, discussion of its components, identification of BL organization models (Staker and Horn, 2012), etc., the beginning and the process of the COVID-19 pandemic are characterized by studies that consider the practical experience of BL implementation. The analysis of key papers (Zagouras et al., 2022; Asghar et al., 2022; Jen and Hoogeveen, 2022; Meulenbroeks, 2020; Vielma Puente and Ruano, 2021; Garcia-Ponce and Mora-Pablo, 2020; Sumarni et al., 2021; Mihret et al., 2022; Şentürk, 2021; Lami et al., 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Alsina Tarrés

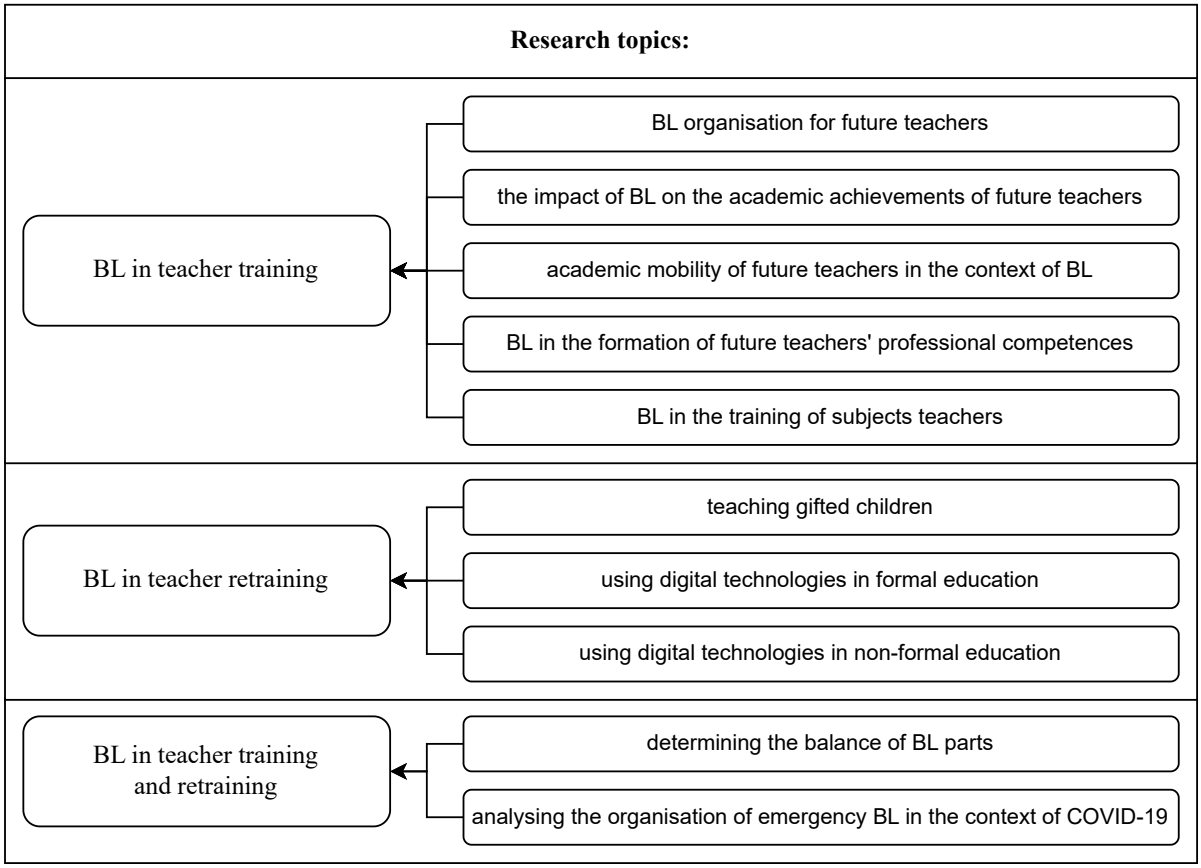


Figure 3: Research topics.

et al., 2022; Jenkins and Crawford, 2021; Joseph and Trinick, 2021; Salonen et al., 2021; Abaci et al., 2021; Glietenberg et al., 2022; Le and Pham, 2021) made it possible to identify the following *leading approaches to BL organisation* (figure 4):

- by the combination method:
  - pre-planned combining of face-to-face, synchronous and asynchronous distance learning (Zagouras et al., 2022; Asghar et al., 2022; Jen and Hoogeveen, 2022; Calderón et al., 2021; Mihret et al., 2022; Ridwan et al., 2020) through BL design (Lami et al., 2021; Ridwan et al., 2020; Abaci et al., 2021);
  - emergency transition from full-time to distance learning (Meulenbroeks, 2020; Sutiah et al., 2020; Abaci et al., 2021; Glietenberg et al., 2022);
  - combining of full-time and part-time forms of learning (Zagouras et al., 2022);
  - combining learning on weekdays and weekends (Zagouras et al., 2022);
  - combining on-campus and distance learning (Zagouras et al., 2022; Şentürk, 2021; Mihret et al., 2022; Jen and Hoogeveen, 2022);
  - combining learning in different physical locations that are related to the student's educational and professional activities (Abaci et al., 2021);
  - combining teaching methods into learning strategies (Ridwan et al., 2020);
- by ICT tools for BL:
  - application of learning support systems: LMS (Blackboard (Zagouras et al., 2022; Glietenberg et al., 2022), Moodle (Zagouras et al., 2022; Jenkins and Crawford, 2021; Salonen et al., 2021), Elena (Sumarni et al., 2021), Google Classroom (Sutiah et al., 2020)) and CMS (Ridwan et al., 2020);
  - institutional training in open courses posted on MOOC platforms (edX (Vielma Puente and Ruano, 2021));
  - application of software tools:
    - to assess learning achievements (Zagouras et al., 2022; Meulenbroeks, 2020; Şentürk, 2021);

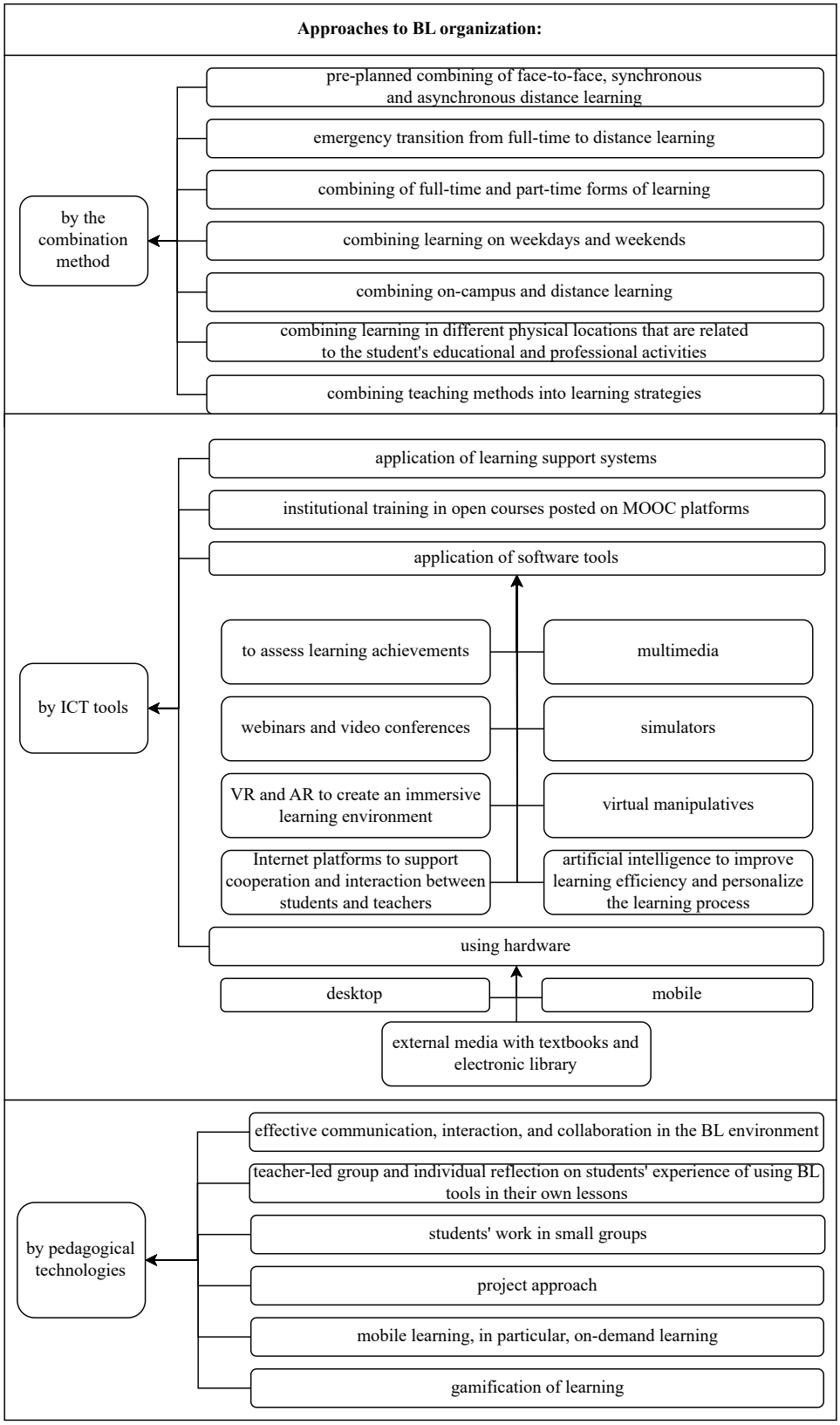


Figure 4: Approaches to BL organization.

    * webinars (Zagouras et al., 2022; Jen and Hoogeveen, 2022; Abaci et al., 2021) and video conferences (Meulenbroeks, 2020; Sutiah et al., 2020; Abaci et al., 2021);
    * multimedia (Asghar et al., 2022) (in particular, informational videos, lecturer recordings (Vielma Puente and Ruano, 2021; Lami et al., 2021; Salonen et al., 2021; Le and Pham, 2021), video blogs (Jen and Hoogeveen, 2022), animations (Şentürk, 2021), presentations (Ridwan et al., 2020; Le and Pham, 2021), and other interactive materials (Vielma Puente and Ruano, 2021));
    * virtual reality (VR) and augmented reality (AR) to create an immersive learning environment (Fragkaki et al., 2020);
    * simulators (Mihret et al., 2022);
    * virtual manipulatives (Mihret et al., 2022);
    * artificial intelligence to improve learning efficiency and personalize the learning process (Salonen et al., 2021; Pospíšilová and Rohlíková, 2023);
    * Internet platforms to support cooperation and interaction between students and teachers:
      · social networks (Joseph and Trinick, 2021);
      · messengers (WhatsApp (Asghar et al., 2022; Kemaloglu Er and Bayyurt, 2022; Salonen et al., 2021));
      · e-mail (Asghar et al., 2022; Salonen et al., 2021);
      · online voting and surveys (Meulenbroeks, 2020; Vielma Puente and Ruano, 2021);
      · online chats (Meulenbroeks, 2020; Calderón et al., 2021; Şentürk, 2021; Abaci et al., 2021);
      · online forums (Meulenbroeks, 2020; Şentürk, 2021; Ridwan et al., 2020; Kemaloglu Er and Bayyurt, 2022; Jenkins and Crawford, 2021);
      · virtual whiteboards (Vielma Puente and Ruano, 2021);
  – using hardware for BL implementation:
    * desktop (computers (Asghar et al., 2022));
    * mobile (laptops (Asghar et al., 2022; Jenkins and Crawford, 2021), mobile phones (Asghar et al., 2022; Kemaloglu Er and Bayyurt, 2022; Jenkins and Crawford, 2021), tablets (Jenkins and Crawford, 2021));
    * external media with textbooks and electronic library (Asghar et al., 2022);
- by pedagogical technologies BL:
  – effective communication, interaction, and collaboration in the BL environment (Zagouras et al., 2022; Şentürk, 2021; Alsina Tarrés et al., 2022; Jenkins and Crawford, 2021; Joseph and Trinick, 2021);
  – teacher-led group and individual reflection on students' experience of using BL tools in their own lessons (Zagouras et al., 2022; Jen and Hoogeveen, 2022; Garcia-Ponce and Mora-Pablo, 2020; Alsina Tarrés et al., 2022; Jenkins and Crawford, 2021);
  – students' work in small groups (Meulenbroeks, 2020; Joseph and Trinick, 2021);
  – project approach (Garcia-Ponce and Mora-Pablo, 2020; Sumarni et al., 2021; Joseph and Trinick, 2021);
  – mobile learning, in particular, on-demand learning (Glietenberg et al., 2022; Jenkins and Crawford, 2021);
  – gamification of learning (Hooda et al., 2022; Handle-Pfeiffer and Winter, 2021).

4 CONCLUSIONS

The identified approaches to BL organization provide a number of advantages, including

- *personalization*: BL provides a more individualized and adapted approach to learning, students can work at their own speed and focus on their specific needs and interests;
- *increased engagement*: the introduction of technology and online resources into the learning process can increase student interest and motivation;
- *flexibility*: BL provides students more flexibility in choosing when and where to study, and can accommodate different learning styles;
- *improved access to resources*: BL gives students access to a wider range of learning materials, such as online videos and simulations, that may not be available in a traditional classroom;
- *increased efficiency*: BL can increase the efficiency of the learning process by allowing teachers to use class time more efficiently and cover more material;
- *intellectualization of learning*: using data to monitor students' progress and make changes to teaching.

At the same time, BL is not without its weaknesses, including

- *access to technology*: for successful BL, teachers, and students need to have access to appropriate

hardware/software and the Internet. For some students, especially those from low-income families, this can be a barrier;

- *technical difficulties*: the use of technology can be subject to technical difficulties and glitches, which can disrupt the learning process and cause frustration for both students and teachers;
- *teacher/student training*: both teachers and students need training on how to integrate/use technology effectively, as well as support in navigating the various BL tools and platforms. As we can see, many institutions have created special commissions/centers for teacher training or technical support during BL or individual consultations, but there are also cases of the absence of such a centralized policy in educational institutions.

REFERENCES

Abaci, S., Robertson, J., Linklater, H., and McNeill, F. (2021). Supporting school teachers' rapid engagement with online education. *Educational Technology Research and Development*, 69(1):29–34. https://doi.org/10.1007/s11423-020-09839-5.

Almendingen, K., Sparboe-Nilsen, B., Kvarme, L. G., and Benth, J. S. (2021). Core Competencies for Interprofessional Collaborative Practice Among Teacher Education, Health and Social Care Students in a Large Scaled Blended Learning Course. *Journal of Multidisciplinary Healthcare*, 14:2249–2260. https://doi.org/10.2147/JMDH.S325086.

Alsina Tarrés, M., Masardo, A., Mallol Macau, C., and Farrés Cullell, I. (2022). Knowledge sharing among teacher trainees in a transnational blended learning exchange. *Revista Complutense de Educación*, 33(4):529–540. https://doi.org/10.5209/rced.76329.

Asghar, M. Z., Afzaal, M. N., Iqbal, J., and Sadia, H. A. (2022). Analyzing an Appropriate Blend of Face-to-Face, Offline and Online Learning Approaches for the In-Service Vocational Teacher's Training Program. *International Journal of Environmental Research and Public Health*, 19(17):10668. https://doi.org/10.3390/ijerph191710668.

Bozkurt, A. (2022). A Retro Perspective on Blended/Hybrid Learning: Systematic Review, Mapping and Visualization of the Scholarly Landscape. *Journal of Interactive Media in Education*, 2022(1):2. https://doi.org/10.5334/jime.751.

Bruggeman, B., Hidding, K., Struyven, K., Pynoo, B., Garone, A., and Tondeur, J. (2022). Negotiating teacher educators' beliefs about blended learning: Using stimulated recall to explore design choices. *Australasian Journal of Educational Technology*, 38(2):98–112. https://doi.org/10.14742/ajet.7175.

Calderón, A., Scanlon, D., MacPhail, A., and Moody, B. (2021). An integrated blended learning approach for physical education teacher education programmes: teacher educators' and pre-service teachers' experiences. *Physical Education and Sport Pedagogy*, 26(6):562–577. https://doi.org/10.1080/17408989.2020.1823961.

Fragkaki, M., Mystakidis, S., and Filippousis, G. (2020). Work-in-Progress-Design and Evaluation of an Augmented and Virtual Reality Flipped-Learning Course for K-12 Educators. In *Proceedings of 6th International Conference of the Immersive Learning Research Network, iLRN 2020*, pages 275–278. https://doi.org/10.23919/iLRN47897.2020.9155200.

Garcia-Ponce, E. E. and Mora-Pablo, I. (2020). Challenges of using a blended learning approach: A flipped classroom in an English teacher education program in Mexico. *Higher Learning Research Communications*, 10(2):116–133. https://doi.org/10.18870/HLRC.V10I2.1209.

Glietenberg, S. H., Petersen, N., and Carolin, A. (2022). Teacher educators' experiences of the shift to remote teaching and learning due to COVID-19. *South African Journal of Childhood Education*, 12(1):a1189. https://doi.org/10.4102/sajce.v12i1.1189.

Handle-Pfeiffer, D. and Winter, C. (2021). Playing and Reflecting Games: The Production of Gamified Learning Artefacts in Teacher Education. *Journal of Higher Education Theory and Practice*, 21(16):164–176. https://doi.org/10.33423/jhetp.v21i16.4923.

Harangus, K., Horváth, Z.-I., and Kovács, G. (2021). Changes and perspectives in teacher training methodology. *Acta Universitatis Sapientiae, Philologica*, 13(2):55–70. https://doi.org/10.2478/ausp-2021-0013.

Herliana, F., Farhan, A., Elisa, Syukri, M., and Mahzum, E. (2021). Perception of Novice Learners Using Blended Learning Approach During the Covid-19 Pandemic. *Journal of Physics: Conference Series*, 2019(1):012032. https://doi.org/10.1088/1742-6596/2019/1/012032.

Hooda, A., Nousiainen, T., Vesisenaho, M., Ahlstrom, E., Fort, S., Subirats, L., and Sacha, G. M. (2022). School of Digital Wizards: Exploring the Gamification User Types in a Blended IT Course. In *2022 IEEE Frontiers in Education Conference (FIE)*, pages 1–5, Los Alamitos, CA, USA. IEEE Computer Society. https://doi.org/10.1109/FIE56618.2022.9962592.

Iyer, S. S., Gernal, L., Subramanian, R., and Mehrotra, A. (2023). Impact of digital disruption influencing business continuity in UAE higher education. *Educational Technology Quarterly*. https://doi.org/10.55056/etq.29.

Jen, E. and Hoogeveen, L. (2022). Design an international blended professional development model for gifted education: An evaluation study. *Evaluation and Program Planning*, 91:102034. https://doi.org/10.1016/j.evalprogplan.2021.102034.

Jenkins, L. and Crawford, R. (2021). Pre-service Music Teachers' Understanding of Blended Learning: Implications for Teaching Post COVID-19. *Australian*

Journal of Teacher Education, 46(7):86–92. https://doi.org/10.14221/ajte.2021v46n7.5.

Jiang, Y., Wang, P., Li, Q., and Li, Y. (2022). Students' Intention toward Self-Regulated Learning under Blended Learning Setting: PLS-SEM Approach. *Sustainability*, 14(16):10140. https://doi.org/10.3390/su141610140.

Joseph, D. and Trinick, R. (2021). 'Staying Apart Yet Keeping Together': Challenges and Opportunities of Teaching During COVID-19 Across the Tasman. *New Zealand Journal of Educational Studies*, 56(2):209–226. https://doi.org/10.1007/s40841-021-00211-6.

Keengwe, J. and Kang, J.-J. (2013). A review of empirical research on blended learning in teacher education programs. *Education and Information Technologies*, 18(3):479–493. https://doi.org/10.1007/s10639-011-9182-8.

Kemaloglu Er, E. and Bayyurt, Y. (2022). Implementation of Blended Learning in English as a Lingua Franca (Elf)-Aware Pre-Service Teacher Education. *Turkish Online Journal of Distance Education*, 23(1):60–73. https://doi.org/10.17718/tojde.1050353.

Kovalchuk, V. I., Maslich, S. V., and Movchan, L. H. (2023). Digitalization of vocational education under crisis conditions. *Educational Technology Quarterly*, 2023(1):1–17. https://doi.org/10.55056/etq.49.

Lami, R., Gastineau, S., Flom, H., and Desdevises, Y. (2021). Big Steps, Little Change: A Case Study in French University Teachers' Cognitions in the Context of Pedagogical Innovation. *Frontiers in Education*, 6. https://doi.org/10.3389/feduc.2021.765771.

Le, P. T. and Pham, H. T. T. (2021). Using Blended Learning in Teacher Training Programs: Perspectives of Pre-service Teachers. *Journal of Educational and Social Research*, 11(2):115. https://doi.org/10.36941/jesr-2021-0035.

Lorenza, L. and Carter, D. (2021). Emergency online teaching during COVID-19: A case study of Australian tertiary students in teacher education and creative arts. *International Journal of Educational Research Open*, 2:100057. https://doi.org/10.1016/j.ijedro.2021.100057.

Meulenbroeks, R. (2020). Suddenly fully online: A case study of a blended university course moving online during the COVID-19 pandemic. *Heliyon*, 6(12):e05728. https://doi.org/10.1016/j.heliyon.2020.e05728.

Mihret, Z., Alemu, M., and Assefa, S. (2022). Effects of Blending Virtual and Real Laboratory Experimentation on Pre-Service Physics Teachers' Attitudes Toward Physics Electricity and Magnetism Laboratories. *Science Education International*, 33(3):313–322. https://www.icaseonline.net/journal/index.php/sei/article/view/434.

Pospíšilová, L. and Rohlíková, L. (2023). Reforming higher education with eportfolio implementation, enhanced by learning analytics. *Computers in Human Behavior*, 138:107449. https://doi.org/10.1016/j.chb.2022.107449.

Ridwan, R., Hamid, H., and Aras, I. (2020). Blended Learning in Research Statistics Course at The English Education Department of Borneo Tarakan University. *International Journal of Emerging Technologies in Learning*, 15(07):61–73. https://doi.org/10.3991/ijet.v15i07.13231.

Salonen, A. O., Tapani, A., and Suhonen, S. (2021). Student Online Activity in Blended Learning: A Learning Analytics Perspective of Professional Teacher Education Studies in Finland. *SAGE Open*, 11(4):21582440211056612. https://doi.org/10.1177/21582440211056612.

Şentürk, C. (2021). Effects of the blended learning model on preservice teachers' academic achievements and twenty-first century skills. *Education and Information Technologies*, 26(1):35–48. https://doi.org/10.1007/s10639-020-10340-y.

Short, C. R., Graham, C. R., Holmes, T., Oviatt, L., and Bateman, H. (2021). Preparing Teachers to Teach in K-12 Blended Environments: A Systematic Mapping Review of Research Trends, Impact, and Themes. *TechTrends*, 65(6):993–1009. https://doi.org/10.1007/s11528-021-00626-4.

Staker, H. and Horn, M. B. (2012). *Classifying K-12 blended learning*. Innosight Institute, Boston, MA.

Sumarni, W., Sudarmin, S., and Kadarwati, S. (2021). Creative skill improvement of the teacher candidates in designing learning programs through a project-based blended learning. *Journal of Physics: Conference Series*, 1918(3):032026. https://doi.org/10.1088/1742-6596/1918/3/032026.

Sutiah, S., Slamet, S., Shafqat, A., and Supriyono, S. (2020). Implementation of distance learning during the COVID-19 pandemic in faculty of education and teacher training. *Cypriot Journal of Educational Sciences*, 15(5):1204–1214. https://doi.org/10.18844/CJES.V15I5.5151.

Theelen, H., Willems, M. C., van den Beemt, A., Conijn, R., and den Brok, P. (2020). Virtual internships in blended environments to prepare preservice teachers for the professional teaching context. *British Journal of Educational Technology*, 51(1):194–210. https://doi.org/10.1111/bjet.12760.

Vielma Puente, J. E. and Ruano, M. A. (2021). Analysis of the usefulness of the basic program of teacher training in a blended learning modality. *Estudios pedagógicos (Valdivia)*, 47:289–298. https://doi.org/10.4067/S0718-07052021000200289.

Yan, Y. and Chen, H. (2021). Developments and Emerging Trends of Blended Learning: A Document Co-citation Analysis (2003–2020). *International Journal of Emerging Technologies in Learning*, 16(24):149–164. https://doi.org/10.3991/ijet.v16i24.25971.

Zagouras, C., Egarchou, D., Skiniotis, P., and Fountana, M. (2022). Face to face or blended learning? A case study: Teacher training in the pedagogical use of ICT. *Education and Information Technologies*, 27(9):12939–12967. https://doi.org/10.1007/s10639-022-11144-y.

The Use of Miro While Formation of Communicative Competence of Future Ship Engineers

Olena Kononova[1][a], Olena Diahyleva[2][b] and Alona Yurzhenko[2][c]
[1]*Maritime Applied College of Kherson State Maritime Academy, 20 Ushakova Str., Kherson, 73001, Ukraine*
[2]*Kherson State Maritime Academy, 20 Ushakova Str., Kherson, 73001, Ukraine*
konon@2017@ukr.net, helen18@online.ua, mz@ksma.ks.ua

Keywords: E-Learning, Miro, Maritime Education and Training, Maritime Professionals, Digitalization.

Abstract: The paper is devoted to the analysis of the use of collaborative whiteboard platform Miro in maritime education and training. It is highlighted that with the help of the board teacher can create and upload content, communicate with others, share or export his/her work. It is mentioned that the board can be used while distance learning for explaining the new material, also, students can use it for drawing, add files, share comments, working on the same project remotely from each other. The benefits of the platform are mentioned in the article. The drawbacks of Miro use while maritime education and training are also listed. The results of the study showed that the use of Miro enabled cadets of maritime institution to improve their ability to communicate effectively, share ideas, and work collaboratively in a virtual environment. The study also found that the use of Miro allowed for increased engagement and motivation among the cadets, which positively impacted their overall learning experience. This work highlights the potential of using Miro as a tool for enhancing communicative competence and suggests further research to explore its effectiveness in other educational contexts.

1 INTRODUCTION

Nowadays informational technologies serve as not only means of communication between states, companies or as form of trade but also as means of education. The idea of introduction of such technologies in educational process involves the achievement of the target of high-quality education where at the end of education we will have a competitive, creative and self-affirmative person in various spheres.

First of all, the internal readiness of the teacher to transform herself/himself (for mastering and training new technologies) is quite important too. Online lessons became a new reality to all education participants. The creation of a single instruction to utilize e-learning technology in the organization of the educational process relies on teachers. They can base on their own experience and the experience of their colleagues, explore materials on didactic possibilities of online resources, determines feasibility and develop the methods of applications.

Distance learning should be organized with the use of a board where teacher and student can work. Many educational institutions choose one platform (e.g. Google Meet, Zoom, Moodle (BigBlueButton), Webex, Skype). But to make lessons more interesting and different tutors always try to find new apps that would be free and easy to use (Diahyleva et al., 2021). Platform Miro was chosen by us because this is a real-time workplace as a "white sheet" of paper on which a teacher and students can write or type something, watch video, fill out mind map, table, etc.

It was founded in 2011 by Andrei Husin and Oleg Chardin, the headquarters is situated in San Francisco. Whiteboard Miro allows to work together on one infinite canvas – boards including remote work of individual employees to create collaborative project (Spivakovsky et al., 2020; Hockly and Dudeney, 2017).

The service interface is in English only, during its utilization the pop-up windows with hints will help to work quick. Miro is one of the best ways to make learning interactive. The principle of this platform is in using boards, that is one project includes the use of several boards in one board. The main board has the organizer of the meeting, the teacher, where he can give the task (text, different activities) with useful links for the video or another resource. The teacher sends notification to inform the students

[a] https://orcid.org/0000-0003-0403-7292
[b] https://orcid.org/0000-0003-3741-4066
[c] https://orcid.org/0000-0002-6560-4601

Kononova, O., Diahyleva, O. and Yurzhenko, A.
The Use of Miro While Formation of Communicative Competence of Future Ship Engineers.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 122-129
ISBN: 978-989-758-579-1

about a new task or information. Another, coordinator board is used for various organizational moments like schedule, recommendations, management issues can be found here. Each participant also has its own board with his/her name, photo and personal information. The students can share here links to the social nets or other platforms and add the tasks they've done (Bezlutska et al., 2021).

Via whiteboard platform Miro is easy to arrange brainstorms (give a task to your group and monitor their work, adjust with the help, give comments, mark the user), set up the team project work (teach your students to work in team, share responsibilities, set objectives, monitor the student's activities and interactions, integrate different tools to boost team efficiency and free team imagination, add comments), conduct consultations.

It can be used also as a textbook where you can add learning material, navigate via the pages with schemes, mind maps, etc. with your group. As for other benefits online board Miro promotes the development of students' creative abilities within the framework of implementation of problem-oriented and project-based training. Project works and interactive interaction of students in distance learning determine the productivity of knowledge acquisition, development of different types of thinking and stimulation of cognitive processes.

The virtual whiteboard service is an effective tool for organizing training process in both synchronous and asynchronous learning formats. The Miro online board is a means of ensuring the efficiency and effectiveness of blended learning in higher educational establishments, which allows productive organization and active interaction of students and teachers in the educational process, the results of which are stored in the cloud environment and can be used at a convenient time. The whiteboard Miro allows to improve interactive activities between students, encourage them to creative cooperation, contribute to the development of project activities, planning and analysis skills in students' activity, provide feedback.

A lot of consumers all over the world deal with the usage of whiteboard Miro, share their ideas and results in closed and open groups about benefits from the implementation of it.

2 METHODS

The research used a complex of interrelated methods: empirical (observation, survey), theoretical (analysis, generalization, comparison). A pedagogical experiment was conducted on the use of the online board Miro in the educational process. The total number of cadets (about 193 males, from 1-3 courses) from Maritime College and Kherson State Maritime Academy took part in this research. Students were divided into two groups: 95 (experimental group) and 98 (control group, in groups with which this method was not used). The observation method was used for control. With the help of theoretical analysis, a review of scientific sources was carried out regarding relevance and perspective with the application of the Miro platform in various spheres of modern activity, including for students of various types of institutions; methodological developments of English language classes for ship engineers have been prepared.

The students of ship engineering department were asked to work online and offline using platform Miro. The interaction between the participants is carried out in comments via tags. Each participant has a personal nick. To send a comment to a student about his work, the teacher put @ and student's name and he will receive the teacher's comment or notification.

Before and after the experiment, a survey was conducted to determine the productivity of using the board. A survey on the LMS Moodle was used. Generalization and comparison methods were used for quantitative and qualitative analysis of the obtained results. The results are processed using responses on LMS Moodle (Kovalchuk et al., 2023; Yurzhenko, 2019).

3 LITERATURE REVIEW

The integration of technology into education has ushered in a new era of teaching and learning, transcending the boundaries of traditional classroom settings. In this context, the collaborative whiteboard platform Miro has emerged as a valuable tool in the domain of maritime education and training.

There are modern educators, instructional designers and researchers in the field of education and technology who have conducted studies or assessments on the effectiveness of Miro as an educational tool. Chan et al. (2023) have decided to promote collaboration between students and teacher/students through online whiteboard interaction. They find Miro an instrument that allows students to easily share ideas and exchange information using a range of different media. The authors listed Miro's advantages, the one of which is its ability to allow real-time sharing and creation of ideas. Among Miro's disadvantages scientists mention its numerous tools and options which does come with a learning curve. By the end of their research authors find Miro a useful option for

encouraging collaboration between students, giving them a workspace to freely generate ideas and share resources (Chan et al., 2023). Freitag et al. (2022) made data analytics on Miro's use to support the evaluation of student activity. They propose Miro as easy-to-use tool to quickly collect group activity data using important key parameters and present it easily (Freitag et al., 2022).

The researches were devoted to find out the effectiveness of using the board in educational process and also pros and cons of whiteboard utilizing at different stages of the lesson (Mickienė and Valionienė, 2021).

Despite found data there we not enough research results devoted to the use of Miro while formation of communicative competence of future ship engineers.

4 RESULTS

One of the effective multimedia resources is represented by the Miro online board, which is used for collaborative learning, and enables teachers and students to work with visual educational content, to effectively establish communication.

Nowadays educational process of some education establishments due to war in Ukraine is conducted in fully distance mode so the role of teacher and student should be changed. The teacher became a consultant who coordinates the educational process; and the student should become an independent and responsible subject of the educational activities. The principle of individualization of students in distance learning is basic in a system of didactic principles for organizing the process of cognition of students. According to this principle it is necessary to organize cognitive activity not at all and in a specific specialty in accordance with its individual characteristics.

It's not necessary to make a fresh start, one of the proposed templates can be used. To start doing it click on the icon "choose template" in the menu on the left, where you can see the option of any form to choose (Sandorova and Betak, 2021; Semerikov et al., 2000). With the help of interactive whiteboard Miro any teacher will have an opportunity to conduct the lessons online and have no difficulty while delivering the material to the class (figure 1).

The teacher can fill in the board with the materials of the lesson with the text books (download it), video or audio. Also, the teacher can manage the attention of his/her students and limit the time to complete the task (Barzii et al., 2020; Bevzenko et al., 2020; Poultsakis et al., 2021). You can offer all students to work on the projects in pairs or groups, filling in templates. The teacher can track those who are most active. If it's necessary, monitor and make corrections or comments using stickers (Lytvynova et al., 2021; Tarasenko et al., 2021; Nechypurenko et al., 2022). Miro has excellent technical equipment, which allows many people to work together on the same board in a real-life time (figure 2).

The teacher can control the board directly from your browser (better to work from PC or tablet). To start with the work on the platform you can choose the Education plan which offers boards and up to 100 participants to work together.

While the lesson it is possible put a timer on students' work to limit the time (Tkachuk et al., 2021; Semerikov et al., 2021; Chan et al., 2023).

In free version of this platform the user has an access to several functions: to write or type on the board; to add stickers, pictures or files with different formats; to create smart cards yourself or use templates; to work as one team on the same board online (figure 3).

There are some restrictions while using free version of Miro platform: to use not more than three boards for editing; next boards are to view only (Piccirillo et al., 2022; Vidhiasi and Syihabuddin, 2022; Hrnić, 2022); all boards are seen by all the Miro platform participants (you can't make them private); there is no access to variety of useful functions (Nosov et al., 2020; Fedorenko et al., 2022; Vakaliuk et al., 2021; Osadcha and Osadchyi, 2021; Freitag et al., 2022; Styles and Polvi, 2022).

The experiment has involved a group of cadets enrolled in a Maritime English course (193 people) of ship engineering department, who would be randomly assigned to either a control group (98 cadets) or an experimental group (95 cadets).

The control group has received traditional Maritime English instruction, while the experimental group would received the same instruction, but with the addition of Miro as a tool to support their learning online. The Maritime English instruction was focused on developing the cadets' communicative competence, which includes skills such as listening, speaking, reading, and writing in English (Sukomardojo and Ratnaningsih, 2022). The results of LMS Moodle quiz done by experimental group is shown below (figure 4). The experimental group has shown greater improvement in the targeted learning outcomes compared to the control group.

After that the experimental group has received training on how to use Miro effectively, including how to create and share digital whiteboards, collaborate with peers, and use visual aids to support their learning. The tutors guided their cadets in using Miro to complete various tasks, such as creating di-

Figure 1: Mind map created on Miro for “Engine room Rules” topic of online lesson.

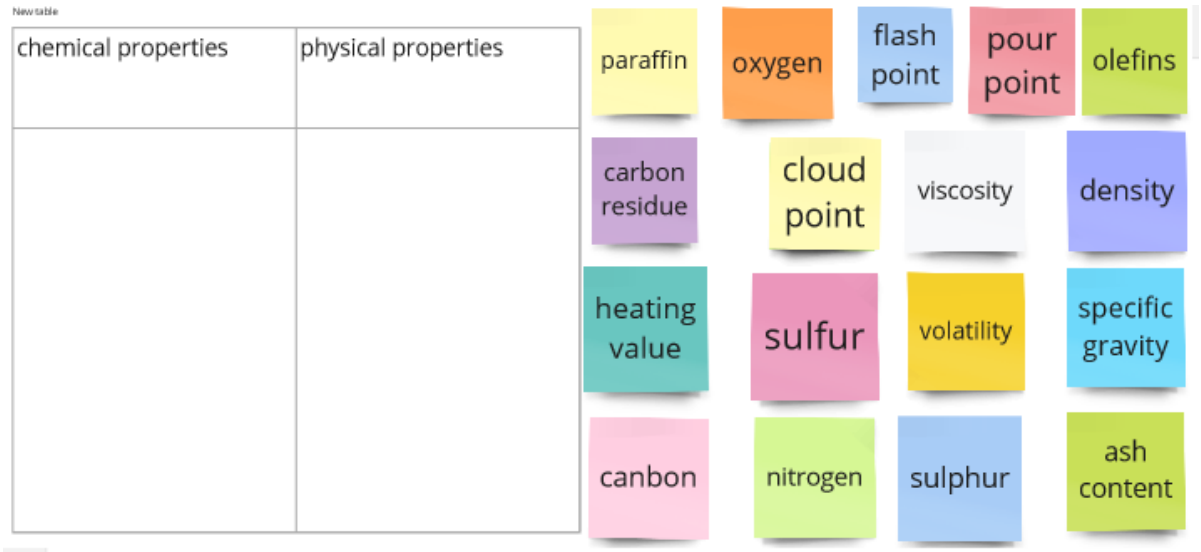


Figure 2: Activity created on Miro platform where cadets need to group the properties of heavy fuel oil.

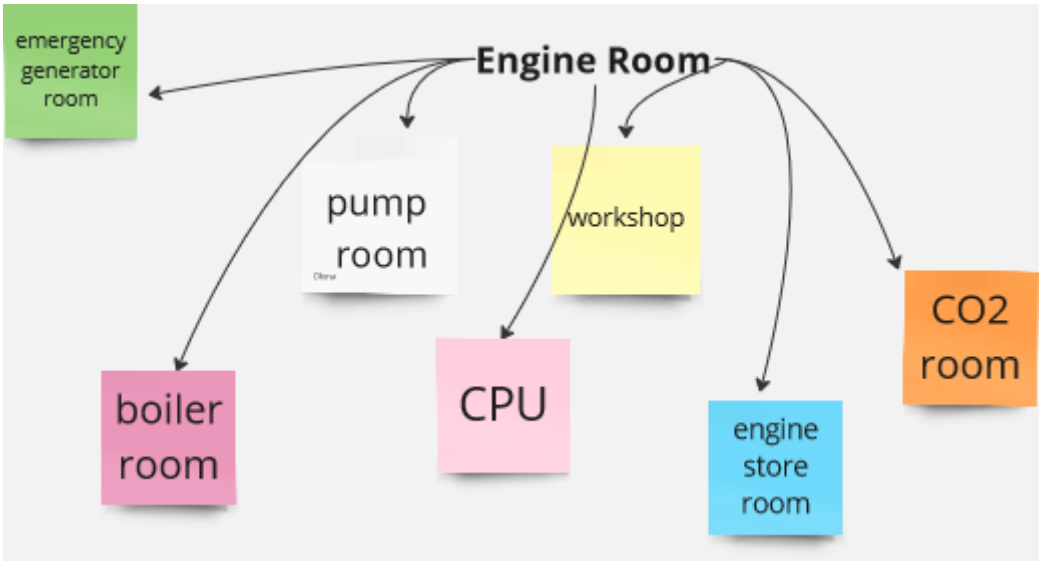


Figure 3: Example of team work on one board created on Miro platform.

agrams, flowcharts, and mind maps, which were related to Maritime English topics for ship engineers (e.g. Engine Room Construction, Marine Boilers, Pumps, Auxiliaries, Main Engine Construction and Types).

Both the control and experimental groups weree assessed using a pre-test and post-test on LMS Moodle (Quiz activity) to measure their communicative competence, including listening, speaking, reading, and writing skills. The tests on LMS Moodle were based on a validated scale and had included both objective and subjective measures.

At the end of experiment the data collected from the pre-test and post-test had been analyzed using

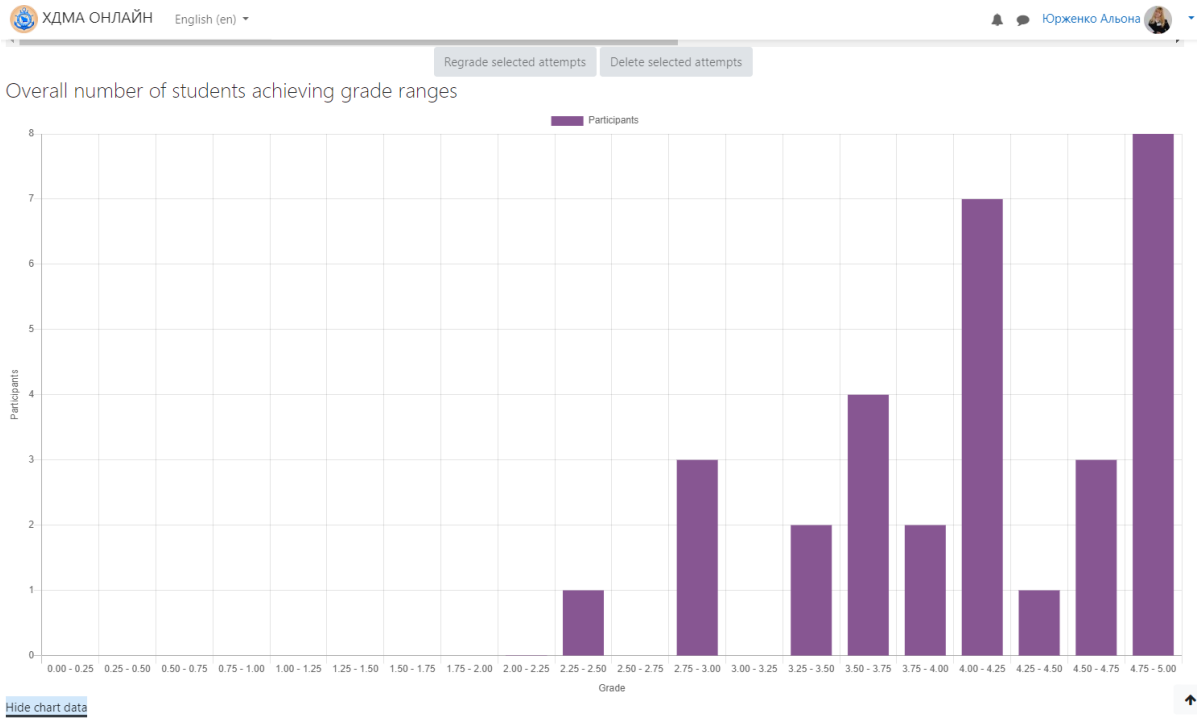


Figure 4: Example of team work on one board created on Miro platform.

statistical methods to determine the effectiveness of Miro in enhancing the cadets' communicative competence. The results were compared between the control and experimental groups to assess the impact of Miro on the cadets' learning.

The pedagogical experiment had been aimed to investigate the potential of Miro as a tool to support Maritime English course and enhance students' communicative competence. The experiment has provided valuable insights into the effectiveness of digital tools in language learning and had informed the development of future language teaching practices. The feedback from experiment participants has been collected by LMS Moodle Questionnaire and showed positive results of the Miro use while Maritime English course.

5 DISCUSSION

The study on the use of Miro for developing communicative competence among future ship engineers provided valuable insights into the potential of this collaborative platform for enhancing students' communication skills. The data showed that the use of Miro facilitated effective communication, idea sharing, and collaboration among the students, which positively impacted their learning experience. The study also revealed that the use of Miro increased students' engagement and motivation, which suggests that this platform has the potential to enhance the overall effectiveness of educational programs. However, the study had some limitations, such as the small sample size (193 cadets) and the specific context of the maritime engineering program. Therefore, Miro allows cadets to visualize complex concepts and ideas, which can enhance their ability to communicate technical information effectively. The platform provides various tools, such as diagrams, flowcharts, and mind maps, which can help cadets to represent complex ideas in a visual and intuitive way. This approach enhances cadets' ability to communicate complex technical information to non-technical stakeholders, such as clients or regulators, which is a critical aspect of communicative competence for ship engineers (Sari and Sari, 2022; Limbong et al., 2022).

Finally, the use of Miro can increase engagement and motivation, which is essential for the development of communicative competence. The platform provides a dynamic and interactive learning environment, which enhances cadets' motivation and encourages them to take an active role in their learning. This approach fosters a positive learning experience, which can enhance confidence and willingness to communicate effectively in different contexts.

Overall, the use of Miro can significantly en-

hance the development of communicative competence among future ship engineers, by providing an effective and engaging online platform for communication, collaboration, and visualization of complex technical information (Moroz, 2022; Abduh et al., 2022; Şihmantepe et al., 2023).

The online board as a means of learning performs not only the function of a visual demonstration of educational materials, but also acts as an effective tool for project work with sources of information in the form of text and multimedia objects. Online board Miro is mostly free (some features are available for an additional fee) as a digital tool for joint interaction of users in real time, while it allows you to use other tools for online learning (such as Zoom and Google services, etc.). You can upload files and documents to the whiteboard workspace, links to sites, audio and video materials, you can draw, take notes, create mind-maps, exchange messages, monitor the progress of students. For work with the Miro online board, you can use ready-made templates from the library or create them independently. Group work on Miro's online whiteboard workspace is accomplished using text, voice, or video chat, as well as real-time collaborative editing and board viewing capabilities. If there is a large number of participants, it is possible turn on the cursor tracking feature, which allows the teacher and students to see each other's actions.

The advantages of using the Miro online board in classes in institutions of general secondary education:

- the possibility of using many media files (images, audio, video materials, text files and documents);
- emphasizing important aspects with multi-colored markers, stickers, geometric shapes, arrows and connections;
- work with the online board as in the mode real time and asynchronously;
- ability to leave comments;
- joint group work on projects;
- the possibility of joint editing in real time;
- text, voice and video chats;
- screen demonstration;
- setting up notifications to track changes in the workplace boards;
- setting up the update section on the board workspace during each new one visiting;
- the ability to download the whiteboard workspace with the results of group work in the format of images or PDF files;
- the possibility of placing vocations on the online board at sites, in social networks;
- availability of a visual library of templates for conducting surveys;
- the ability to add tables and diagrams, business templates, organizing and conducting brainstorming, etc.

6 CONCLUSIONS

Online whiteboard Miro is the medium provision of blended education, which makes it possible an effective organization of active interaction of students and teachers in the educational process, the results of which stored in the cloud environment and can be accessed at a convenient time at the appropriate links. Online whiteboard Miro allows to improve interactive interaction between students and feedback, to encourage them to creative cooperation, contributes to the development of project activities students, the ability to plan and analyze their activities. We see the prospect of further scientific research in the diversification of blended learning by means of information technologies.

The whiteboard platform Miro can be used free of charge via the official website. It is enough to register on it, create a project and share a link to it with students. If you plan to use it regularly for study or work, you should buy one of the paid versions: Team, Business or Enterprise. An online whiteboard is a great tool to mix online and offline learning, leaving only the pros of each format. You don't need to be in the same room with the students, to motivate and to engage them into the process. Whiteboard Miro is an interactive board which is accessible via the internet; you and your students can write, type, draw, add files, videos, etc., and these activities can be visible anywhere in the world. Via the board you can create layouts, use chat, do screen broadcast, work in presentation mode and hold online lessons. Overall, Miro is a good service with convenient interface, a large set of different tools and features.

REFERENCES

Abduh, M., Hasnur, J., and Siska, S. (2022). The effect of maritime English vocabulary for beginners module on the vocabulary learning outcomes. *Jurnal Pendidikan Vokasi*, 12(2):117–129. https://doi.org/10.21831/jpv.v12i2.49033.

Barzii, Y., Litikova, O., Ohorodnyk, N., Solovei, H., and Usova, Y. (2020). *Smart control: course book*. Borysfen, Kherson.

Bevzenko, Y., Lantseva, T., Kravchenko, D., Soloviova, N., Petrushenko, O., and Putrya, Y. (2020). *On the beam. Elementary: coursebook*. Timex, Kherson.

Bezlutska, O., Leshchenko, A., Zahorodnia, Y., Tarasenko, T., Sherman, M., and Smyrnova, I. (2021). Management qualities of the marine cadets. *Journal of Management Information and Decision Sciences*, 24(1):1–12. https://tinyurl.com/5x83m6nz.

Chan, T. A. C. H., Ho, J. M.-B., and Tom, M. (2023). Miro: Promoting Collaboration through Online Whiteboard Interaction. *RELC Journal*, page 00336882231165061. https://doi.org/10.1177/00336882231165061.

Diahyleva, O. S., Gritsuk, I. V., Kononova, O. Y., and Yurzhenko, A. Y. (2021). Computerized adaptive testing in educational electronic environment of maritime higher education institutions. *CTE Workshop Proceedings*, 8:411–422. https://doi.org/10.55056/cte.297.

Fedorenko, O. H., Havrysh, O. H., and Velychko, V. Y. (2022). Features of using Moodle tools in the training of future social workers. *Educational Dimension*, 7:261–281. https://doi.org/10.31812/educdim.4714.

Freitag, N., Serafin, A., and Schmidt, S. (2022). Learning analytics dashboards for online collaboration whiteboards: Feasibility check of an activity dashboard to support the evaluation of student activity within Miro. *International Journal of Management, Knowledge and Learning*, 11. https://doi.org/10.53615/2232-5697.11.207-214.

Hockly, N. and Dudeney, G. (2017). Digital Learning in 2020. In Carrier, M., Damerow, R. M., and Bailey, K. M., editors, *Digital Language Learning and Teaching: Research, Theory, and Practice*, pages 235–245. Routledge, New York. https://doi.org/10.4324/9781315523293-20.

Hrnić, M. (2022). The Attitudes of Students and Teachers, Future and Former Seafarers, Towards the Importance of Maritime English. *NAŠE MORE: znanstveni časopis za more i pomorstvo*, 69(1):30–39. https://doi.org/10.17818/NM/2022/1.5.

Kovalchuk, V. I., Maslich, S. V., and Movchan, L. H. (2023). Digitalization of vocational education under crisis conditions. *Educational Technology Quarterly*, 2023(1):1–17. https://doi.org/10.55056/etq.49.

Limbong, S., Jabu, B., and Basri, M. (2022). The Perception Of Synchronous Model Of Marlins For Maritime English In An Indonesian Maritime Higher Education. *Journal of Positive School Psychology*, 6(12):1366–1378. https://journalppw.com/index.php/jpsp/article/view/14943.

Lytvynova, S. H., Semerikov, S. O., Striuk, A. M., Striuk, M. I., Kolgatina, L. S., Velychko, V. Y., Mintii, I. S., Kalinichenko, O. O., and Tukalo, S. M. (2021). AREdu 2021 - Immersive technology today. In Lytvynova, S. H. and Semerikov, S. O., editors, *Proceedings of the 4th International Workshop on Augmented Reality in Education (AREdu 2021), Kryvyi Rih, Ukraine, May 11, 2021*, volume 2898 of *CEUR Workshop Proceedings*, pages 1–40. CEUR-WS.org. https://ceur-ws.org/Vol-2898/paper00.pdf.

Mickienė, R. and Valionienė, E. (2021). Modelling the Effectiveness Index of Digital Marketing Strategy Oriented to Increase the Popularity of Maritime Education. *TransNav, the International Journal on Marine Navigation and Safety of Sea Transportation*, 15(3):559–567. https://doi.org/10.12716/1001.15.03.08.

Moroz, O. L. (2022). On some organizational aspects of efficient Maritime English teaching. *Věda a perspektivy*, (2(9)):112–123. https://doi.org/10.52058/2695-1592-2022-2(9)-112-122.

Nechypurenko, P. P., Semerikov, S. O., Selivanova, T. V., and Shenayeva, T. O. (2022). How can the principles of learning be used to select the best ICT tools for computer-based chemistry instruction in high school? *Educational Dimension*, 7:188–241. https://doi.org/10.31812/educdim.4738.

Nosov, P., Zinchenko, S., Popovych, I., Safonov, M., Palamarchuk, I., and Blakh, V. (2020). Decision support during the vessel control at the time of negative manifestation of human factor. In Subbotin, S., editor, *Proceedings of The Third International Workshop on Computer Modeling and Intelligent Systems (CMIS-2020), Zaporizhzhia, Ukraine, April 27-May 1, 2020*, volume 2608 of *CEUR Workshop Proceedings*, pages 12–26. CEUR-WS.org. https://ceur-ws.org/Vol-2608/paper2.pdf.

Osadcha, K. P. and Osadchyi, V. V. (2021). The use of cloud computing technology in professional training of future programmers. *CTE Workshop Proceedings*, 8:155–164. https://doi.org/10.55056/cte.229.

Piccirillo, I. N., Amaral, D. C., de Oliveira, M. G., and Ferreira, E. B. (2022). Digital roadmapping in the pandemic: lessons from collaboration in the glass industry. *Technology Analysis & Strategic Management*, pages 1–15. https://doi.org/10.1080/09537325.2022.2061344.

Poultsakis, S., Papadakis, S., Kalogiannakis, M., and Psycharis, S. (2021). The management of Digital Learning Objects of Natural Sciences and Digital Experiment Simulation Tools by teachers. *Advances in Mobile Learning Educational Research*, 1(2):58–71. https://doi.org/10.25082/AMLER.2021.02.002.

Sandorova, Z. and Betak, N. (2021). E-learning and developing intercultural communicative competences in the english language during the COVID-19 quarantine: Tourism students' feedback and recommendations. In *INTED2021 Proceedings*, 15th International Technology, Education and Development Conference, pages 6174–6182. IATED. https://doi.org/10.21125/inted.2021.1240.

Sari, L. I. and Sari, R. H. (2022). Lecturers' Challenges and Strategies in Teaching Maritime English Online to Students with Low English Proficiency. *Register Journal*, 15(2):222–244. https://doi.org/10.18326/rgt.v15i2.222-244.

Semerikov, S. O., Soloviov, V. M., and Teplytskyi, I. O. (2000). Instrumentalne zabezpechennia kursu kompiuternoho modeliuvannia [Instrumental support of the course of computer modeling]. *Kompiuter u shkoli i simi*, (4):28–31. https://lib.iitta.gov.ua/704129/.

Semerikov, S. O., Teplytskyi, I. O., Soloviev, V. N., Hamaniuk, V. A., Ponomareva, N. S., Kolgatin, O. H., Kolgatina, L. S., Byelyavtseva, T. V., Amelina, S. M., and Tarasenko, R. O. (2021). Methodic quest: Reinventing the system. *Journal of Physics: Conference Series*, 1840(1):012036. https://doi.org/10.1088/1742-6596/1840/1/012036.

Şihmantepe, A., Solmaz, M. S., and Aşan, C. (2023). Improving Maritime English Oral Communication Skills in an Online Environment: Engaging Students as Teams. In Xiang, C. H., editor, *Research Anthology on Remote Teaching and Learning and the Future of Online Education*, pages 349–369. IGI Global. https://doi.org/10.4018/978-1-7998-7226-9.ch014.

Spivakovsky, A., Petukhova, L., Anisimova, O., Horlova, A., Kotkova, V., and Volianiuk, A. (2020). ICT as a Key Instrument for a Balanced System of Pedagogical Education. In Bollin, A., Mayr, H. C., Spivakovsky, A., Tkachuk, M. V., Yakovyna, V., Yerokhin, A., and Zholtkevych, G., editors, *Proceedings of the 16th International Conference on ICT in Education, Research and Industrial Applications. Integration, Harmonization and Knowledge Transfer. Volume I: Main Conference, Kharkiv, Ukraine, October 06-10, 2020*, volume 2740 of *CEUR Workshop Proceedings*, pages 307–321. CEUR-WS.org. https://ceur-ws.org/Vol-2740/20200307.pdf.

Styles, E. B. and Polvi, E. J. (2022). The Importance of Ending Well: A Virtual Last Class Workshop for Course Evaluation and Evolution. *Teaching and Learning Inquiry*, 10. https://doi.org/10.20343/teachlearninqu.10.28.

Sukomardojo, T. and Ratnaningsih, D. (2022). The Using of Media Games to Improve SMCP (Standard Marine Communication Phrases) Vocabulary in Maritime English. In *Proceedings of the 3rd International Conference of Education and Science, ICES 2021, November 17-18, 2021, Jakarta, Indonesia*. EAI. https://doi.org/10.4108/eai.17-11-2021.2318627.

Tarasenko, R. O., Amelina, S. M., Semerikov, S. O., and Shynkaruk, V. D. (2021). Using interactive semantic networks as an augmented reality element in autonomous learning. *Journal of Physics: Conference Series*, 1946(1):012023. https://doi.org/10.1088/1742-6596/1946/1/012023.

Tkachuk, V., Yechkalo, Y., Semerikov, S., Kislova, M., and Hladyr, Y. (2021). Using Mobile ICT for Online Learning During COVID-19 Lockdown. In Bollin, A., Ermolayev, V., Mayr, H. C., Nikitchenko, M., Spivakovsky, A., Tkachuk, M., Yakovyna, V., and Zholtkevych, G., editors, *Information and Communication Technologies in Education, Research, and Industrial Applications*, pages 46–67. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-030-77592-6_3.

Vakaliuk, T. A., Spirin, O. M., Lobanchykova, N. M., Martseva, L. A., Novitska, I. V., and Kontsedailo, V. V. (2021). Features of distance learning of cloud technologies for the organization educational process in quarantine. *Journal of Physics: Conference Series*, 1840(1):012051. https://doi.org/10.1088/1742-6596/1840/1/012051.

Vidhiasi, D. M. and Syihabuddin, S. (2022). Maritime English: Teaching English for Maritime Sciences or Teaching Maritime Sciences in English? *Saintara: Jurnal Ilmiah Ilmu-Ilmu Maritim*, 6(1):71–77. https://doi.org/10.52475/saintara.v6i1.152.

Yurzhenko, A. Y. (2019). An e-course based on the LMS Moodle to teach "Maritime english for professional purpose". *Information Technologies and Learning Tools*, 71(3):92–101. https://doi.org/10.33407/itlt.v71i3.2512.

Pre-Service Teachers' Perceptions on Implementing the Trauma-Informed Approach in Educational Institutions

Tetiana Holovatenko[1][a]
[1]*Borys Grinchenko Kyiv University, 18/2 Bulvarno-Kudriavska Str., Kyiv, 04053, Ukraine*
t.holovatenko@kubg.edu.ua

Keywords: Attitudes, Competence, Knowledge, Trauma Response, Teacher Training.

Abstract: This study examines pre-service teachers' perceptions of their knowledge and competence in implementing trauma-informed approach. The study has a quantitative design and is set in Ukraine. Participants (N=54) are pre-service teachers affiliated with early childhood or primary education institutions during their practical training. The study is set amidst a full-scale war in Ukraine. Based on the descriptional statistics, the author concludes participants perceive their knowledge about trauma as average or below average. However, they express relatively higher confidence in their competence to implement trauma-informed practices. The study demonstrates the importance of the extensive introduction of a trauma-informed approach in teacher training and formal preparation of pre-service teachers to implement trauma-informed practices. The author outlines the suggested content plan for teaching The study adds to the field of pre-service teacher training and scholarly research on trauma-informed practices.

1 INTRODUCTION

The full-scale invasion of Russia in sovereign Ukraine in 2022 has impacted the education landscape not only in Ukraine but abroad as well. It has disrupted education for two-thirds of Ukrainian children who are not currently enrolled in the Ukrainian national education system (UNI, 2024). Moreover, as of July 2023, 6,302,600 refugees from Ukraine were recorded globally (Operational Data Portal, 2024). According to Ukrainian data provided by the Ministry of Reintegration of the Temporarily Occupied Territories of Ukraine, as of January 2023, there are 4,867,106 internally displaced people officially registered in Ukraine (Ukrinform, 2023).

Preparing pre-service teachers to respond to challenges currently imposed on the education system should become one of the top priorities of all teacher training institutions. Some of the challenges of teaching students in wartime include continuous blackouts, lack of Internet access, and as a result – inconsistent knowledge of students. Moreover, a study in Kyiv schools has shown that Ukrainian school students are looking for emotional support from adults and having sessions with psychologists (Khoruzha et al., 2023). According to the study on psychosocial stress and emotional health among school children in Donetsk and Luhansk oblasts, 31% of 9 to 11-year-olds have a high level of post-traumatic stress. This is compared to 24% of 12-14-year-olds and 15-17-year-olds (NUK, 2023). This data illustrates that young learners are particularly vulnerable to stress and are affected by military actions.

This statistic is not unique to Ukraine but is a rising issue across the world. For instance, according to SAMHSA, more than two-thirds of children reported at least 1 traumatic event by age 16 (SAMHSA, 2023). Among traumatic events mentioned by the organization, there are psychological, physical, or sexual abuse; community or school violence; witnessing or experiencing domestic violence; national disasters or terrorism; commercial sexual exploitation; sudden or violent loss of a loved one; refugee or war experiences; military family-related stressors (e.g., deployment, parental loss or injury); physical or sexual assault; neglect; serious accidents or life-threatening illness (SAMHSA, 2023).

All these traumatic events are not a challenge for various countries and as a result, it is important for educators to be able to respond to the challenges students experience related to their previous experiences.

In the next section the author analyzes the theoretical underpinnings of the research on pre-service teachers' perceptions on implementing the trauma-

[a] https://orcid.org/0000-0002-7545-3253

Holovatenko, T.
Pre-Service Teachers' Perceptions on Implementing the Trauma-Informed Approach in Educational Institutions.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 130-137
ISBN: 978-989-758-579-1

informed approach in educational institutions.

2 THEORETICAL GROUNDING

2.1 A Trauma-informed Approach to Education

In this section, the author analyses various scholarly approaches to defining the scope of the trauma-informed approach.

Recently teacher practitioners indicated a growing number of students with signs of trauma, such as behavioural issues, academic challenges, stress and anxiety, and mental health issues. To address this issue, a lot of teachers implement trauma-informed practices.

The core of trauma-informed practices is the idea that every individual has experienced some kind of trauma in their life, but the impact of the trauma differs from case to case (Berardi and Morton, 2019). The aftermath of coping with trauma is a complex of factors, such as what the stressful event was, access to internal and external resources, and reinforcing inner neural networks to cope with stress.

According to Forbes et al. (2020), the trauma-informed model can be described as an opposition of the "regulated" and "dysregulated" state of students.

The author of this paper thinks that a Regulatory approach to responding to traumatic events creates a welcoming space for all students as they are, no matter what behaviour they demonstrate. Hence, it is one of the reasons why all classrooms and schools should become trauma-informed.

An overarching idea is expressed by Venet (2021), who states that focusing on the individual needs of students, does not respond to the community needs and leads to continuous problems within a school. Venet (2021) suggests adopting the Universal approach regardless of the number of students who are traumatized.

Both Universal and Regulatory approaches have one thing in common – they advocate for creating a trauma-informed environment across the school regardless of the fact of previous traumatic experiences of the majority of students if any.

Implementing trauma-informed practices in schools plays an important role in creating a welcoming environment for those who experienced a different scale of traumatic events (Berger and Martin, 2021). However, according to Berger and Martin (2021), a lack of common understanding of the notion of trauma-informed learning between scholars and a lack of teachers' knowledge of effective approaches to its implementation leads to a situation, where instructors are unable to recognize behaviour, impacted by trauma, and lack access to resources necessary to support students. Scholars stated the importance of raising awareness among instructors on the need to implement comprehensive trauma-informed strategies, make a justified choice of those strategies, and be able to give first psychological aid in case their students need it. Berger and Martin (2021) consider the lack of research, dissemination, and professional training to be the main reasons why system-wide implementation of trauma-informed learning is not introduced.

The author of this paper agrees on the importance of adopting a comprehensive approach to preparing pre-service teachers grounded in research-evidenced practices and practices supported by evidence, as well as the provision of continuous professional training for in-service teachers.

Jakobson (2021) studied how trauma-informed school frameworks are used to support the social and emotional needs of learners and made a very similar conclusion. The scholar dwells on the successful examples of teaching students regulation skills and the importance of building strong relationships between students and teachers as an initial step in proceeding with instruction.

Analysis of previous research shows that scholars have been consistently advocating for the implementation of a system-wide trauma-informed approach and appropriate professional teacher training (Berger and Martin, 2021; Jakobson, 2021).

Research on the practices of implementing the trauma-informed approach in school settings gives insights into how a system of implementing the trauma-informed approach across the school might look like.

Trauma-informed practices in school settings comprise six elements, such as district-level support, school support, educators' competence, trauma-informed classrooms, community support, regulation and support systems (Morton and Berardi, 2018). Scholars indicate that trauma-informed practices only work in their correlation and thus enhance each of its elements.

Based on the phenomenological study, Choice-Hermosillo (2020) grounds the conditions of the success of trauma-informed practices in education settings in five domains: Relational Trust and Classroom Community and Culture; Emotional and Physical Regulation; System-level Support: Purposeful Implementations; System-level Support: Backgrounds, and Teacher Coaching; and Accountability with Compassion. Choice-Hermosillo (2020) highlights the importance of the implementation of Social and Emo-

tional Approach to teaching, delivering continuous professional development of school staff, as well as providing support for teachers working with traumatized children.

This scholarly research provides for some of the implications: it is important to prepare pre-service teachers to work with children having trauma or mental health issues; it is necessary to create school-wide culture of trauma-informed practices to ensure success of trauma-informed practices by carefully designing the correlations between each of its elements.

2.2 Attitudes of Teachers to the Implementation of Trauma-informed Practices

In this section, the author analyses findings of research related to studying the attitudes of teachers to the implementation of trauma-informed approach in their classrooms or school-wide.

Veach (2021) in a qualitative case study of elementary educators' attitudes and perceptions towards working with students impacted by trauma showed staff has a positive perception of trauma-informed practices. However, participants of the study indicate their attitudes have changed over time as a result of a series of professional development events and collaborative activities with other staff whose primarily responsibilities is working with traumatized students.

The author of this paper finds it important to develop a complex approach to building the matrix of the implementation of the trauma-informed approach with a diversity of perspectives from professionals in various areas, including classroom teachers, subject teachers, psychologists, leadership, nurses, and special education teachers.

Vincent (2020) examined the perceptions of educators towards trauma-informed practices in school settings and the findings show that more than 66% of respondents (N=61) strongly agree with the importance of trauma-informed strategies. However, the same amount of respondents indicated they did not have any instruction on trauma-informed practices in their licensure preparation. At the same time, only around 5% of participants perceive themselves as those who mastered trauma-informed practices.

The result of this research shows the importance of the introduction of trauma-informed studies in pre-service teacher preparation and further developing in-serve teachers' expertise in the area. Among some of the attempts to bring trauma-related issues into the in-service practice of elementary school teachers the author's attention is drawn to Drymond's study. Drymond (2020) has studied the perceptions of elementary school teachers to address the mental health needs of students through trauma-informed practices. The participants of the study (N=299) demonstrated some confidence in responding to the mental health problems of their students. However, they reported low levels of efficacy in recognizing signs of mental health issues, referring students to get specialized support and discussing mental health issues with caregivers (Drymond, 2020).

This study once again confirms the need to destigmatize mental health education among practitioners with a focus on the educational perspective.

Among the studies incorporating intervention in the form of educating on the trauma-informed approach implementation, the author's attention is drawn to Mikolajczyk's (Mikolajczyk, 2018) and Metzinger's (Metzinger, 2021). Mikolajczyk (2018) has studied perceptions of knowledge, competence, school climate and program effectiveness during and after participation in a trauma-informed care professional development. The study shows that with more knowledge and training on trauma-informed practices, participants have only slightly increased their perceived knowledge and competence.

Metzinger's study has a similar aim to Mikolajczyk's and focuses on investigating the perceptions of trauma in the classroom and the levels of trauma awareness among primary and secondary teachers. One of the major findings in Metzinger's study shows that elementary school teachers implement a significant number of trauma-informed strategies in the classroom (Metzinger, 2021). However, their perceived self-efficacy was relatively moderate.

This leads to the conclusion that providing in-service teachers with professional development trainings does not always lead to desired outcomes of becoming better trauma-informed teachers.

Hence, it is important to suggest pre-service teachers with systemic knowledge of trauma-informed practices rather than covering the gaps of their knowledge with individual training sessions. Moreover, the analysis of scholarly research has shown that pre-service teachers' perspectives on their perceived awareness of the trauma-informed approach.

Overall, educators positively perceive trauma-informed practices in schools. At the same time, they indicate some gaps in their knowledge and skills in implementing trauma-informed practices. These findings raise the importance of building a system of pre-service and in-service teacher training to build trauma-informed educational settings.

3 METHODOLOGY

This paper aims to identify pre-service teachers' perceived awareness of trauma and its impact on students. The research is guided by the following research question How do pre-service teachers perceive their knowledge, and competence in implementing trauma practices in educational settings?

The author has adopted Mikolajczyk's (Mikolajczyk, 2018) study methodology (study tool and analysis framework). However, the author of this paper has modified the procedure and the research question for pre-service teachers as a target group.

3.1 Participants of the Study

The study was carried out in February-May 2023 in Ukraine, which is amidst full-scale war. The survey was administered on a non-probability sample. The criteria for inclusion were being pre-service teachers of any major (*N*=54).

Table 1 shows the demographic data of participants. All of them have no prior teaching experience. 98.1% of them identified themselves as women and 1.9% as non-binary. The Ukrainian system of pre-service teacher training is a binary concurrent model represented by the university and non-university sectors. Pre-service teacher training comprises simultaneous theoretical instruction and pedagogical training and internship in the workplace (Kotenko and Holovatenko, 2020). 64.8% of participants have no formal pedagogical experience, 11.1% of participants have been associated with early childhood education institutions in any capacity, and 24.1% of respondents have been associated with primary education institutions. Respondents indicated only 9.3% of them received training in crisis response and/or trauma. The training they mentioned was an online course on working with internally displaced children, teaching in times of crisis, crisis and trauma response training, and having prior medical education.

Table 1: Demographic data of participants.

Type of data	Frequency	Percent
Gender identification		
Woman	53	98.1%
Man	0	0
Non-binary	1	1.9%
Prefer not to answer	0	0
Including this year, how many years of teaching experience do you have?		
No teaching experience	54	100%
1-3 years	0	0
Type of educational institution you are affiliated with during the internship		
No formal pedagogical experience	35	64.8%
Early childhood education institutions, ISCED 0	6	11.1%
Primary education institutions, ISCED 1	13	24.1%
Have you ever had training in crisis response and/or trauma?		
Yes	5	9.3%
No	49	90.7%

3.2 Data collection and analysis plan

The quantitative data in this paper was obtained through the adapted survey developed by Mikolajczyk (2018). The survey tool has 13 questions to identify students' perceived knowledge and competencies through the Likert scale tool. The survey was tailored to the needs of pre-service teachers.

Participants were asked to share their opinion on knowledge about the prevalence of trauma, and their perceived competence in working with traumatized children. The survey was grounded in ARTIC scale (Attitudes related to trauma-informed care). Participants could choose their answer on a scale from 1 (Strongly disagree) to 5 (Always true of me). The survey was distributed in Google Forms and data was transferred to Excel, where it was analyzed. 'Strongly disagree' was coded as 1, 'Disagree' was coded as 2; 'Neither Disagree nor Agree' was coded as 3, 'Agree' was coded as 4; and 'Strongly agree' was coded as 5. The author checked the internal reliability of the tool using Alpha Cronbach α=0.760, which showed its acceptable level of tool consistency (Taber, 2018). The data analysis details are provided in the next section of this paper.

4 RESULTS AND DISCUSSIONS

This study aimed to investigate what perceptions pre-service teachers have related to their knowledge and competence around trauma-informed approach to education. In this section the author presents the research results and their implications for practice.

The first component of teachers' perceptions the author wants to identify is their knowledge about trauma. The hypothesis is that pre-service teachers do not have formal instruction on trauma, but due to the unique Ukrainian context, they to some extend either empathise students or use knowledge about their experiences to understand their students.

Table 2 illustrates pre-service teachers' percep-

Table 2: Pre-service teachers' perceptions of own knowledge base of trauma.

Descriptive statistics	Value
Mean	3.629
Median	3.714
Mode	3.857
Standard Deviation	0.975
Skewness	-0.599

tions of their own knowledge about trauma. Participants were asked 7 questions about their perceived knowledge about the impact trauma can have on a child or adolescent's academic success; their behaviour; about different types of trauma; about the ways that violence and traumatic experiences can lead to mental health and co-occurring disorders; ways staff should take into account how students' learning difficulties should be accommodated at educational institutions; about reasons of students' behaviour; about how to get help if the teacher is struggling.

On average, pre-service teachers are not sure if they know about different types of trauma, ways that violence and traumatic experiences influence students, learning and behavioural difficulties students might have because of trauma, and how working with students having traumatic experiences influences teachers. The mean, median and mode of the data indicate that participants do not percept their knowledge as noteworthy. Negative skewness indicates that the data is unevenly skewed to the left, which means that a relatively high number of participants' answers lies below the mean value.

One of the main results of the study is pre-service teachers have rather mixed opinions on their knowledge of trauma. If comparing the mean in this domain with the pre-test in Mikolajczyk (2018), the latter is smaller (3.21) than in this study (3.629). One of the reasons for that the author sees in the study settings. This study is set in Ukraine, which is in the middle of a full-scale war with constant shellings of all settlements where both instructors and students are traumatized. In an intuitive way, pre-service teachers feel they are more knowledgeable about trauma compared to participants of the school staff in a peaceful country. At the same time, it should be mentioned that the variety and intensity of various types of trauma participants are expected to face their students exhibiting are also slightly different.

At the same time, this result indicates that Ukrainian pre-service teachers are ready to learn about trauma-informed practices and the issue of implementation of a unit or a course on trauma-informed practices is of great importance and urgency. The importance of the inclusion of trauma-informed training in pre-service teacher training is actualized by Berger and Martin (2021), Morton and Berardi (2018), Vincent (2020) and other scholars.

Based on the questions in the survey tool and participants' answers, the author suggests teaching the basics of the trauma-informed approach to pre-service teachers based on the following topics:

- The notion of trauma-informed approach to education;
- The neurobiology of trauma and its impact on people;
- Classroom management as a way to regulate individual students;
- Classroom management as a way to create a trauma-informed classroom space;
- Approaches to building the trauma-informed supporting school environment.

Another component of the study of pre-service teachers' perceptions of implementing the trauma-informed approach is their perceived competence.

Participants were asked 6 questions on their ability to explain to students what trauma is, including the effects of an event; their ability to recognize the signs of trauma, even if the student does not verbally express them; ability to establish trust and safety as a priority in their work with students; being comfortable discussing or explaining trauma to others; ability to impact a student's behaviour in a positive way regardless of how they are raised; being able to focus on student strengths.

The analysis of descriptive statistics on the perceived competence of pre-service in trauma-informed practices is demonstrated in table 3. On average, participants see themselves as relatively competent in explaining students what trauma is and its effect on students, recognizing the signs of trauma, establishing trust and safety in their work, influencing students' behaviour in a positive way, identifying and incorporating students' strengths and interests in the learning process, presenting information using various modalities, and being comfortable discussing and explaining trauma to others. However, the data is distributed asymmetrically with a slight left skewness indicating there is a slightly higher number of participants with perceptions slightly below the mean value.

The comparison of pre-service teachers' perceptions of their knowledge and competence indicates that participants, on average, feel slightly more competent in their practices than in their knowledge of trauma. However, the standard deviation for knowledge (0.975) is slightly higher than for competence (0.881), which means there is more variability in

Table 3: Pre-service teachers' perceptions of their own competence in trauma-informed practices.

Descriptive statistics	Value
Mean	3.805
Median	3.75
Mode	3.5
Standard Deviation	0.881
Skewness	-0.377

the perceptions of knowledge compared to competence. Comparing the skewness values shows that the skewness for competence (-0.377) is smaller than that of knowledge (-0.599), meaning a slightly more balanced distribution for competence perceptions. Hence, the perceived competence of participants is slightly higher than their knowledge about trauma.

This result shows lack of correlation between students' perceived knowledge about trauma response and their perceived competence in implementing the trauma-informed approach. The author thinks this might be due to the fact that pre-service teachers themselves are in the situation of trauma and a lot of teacher trainers use trauma-informed strategies in preparing pre-service teachers. However, this case should be further researched.

The mean in the perceived competence domain in Mikolajczyk's (Mikolajczyk, 2018) pre-test is higher (3.91) than in this study (3.805). The author that school staff, who are participants in Mikolajczyk's study have more experience directly being involved with traumatized children. According to Drymond (2020), Metzinger (2021), and Veach (2021), even experienced teachers mention they lack support in identifying suitable trauma-informed practices and providing help to their students.

Overall, pre-service teachers have rather mixed perceptions of their knowledge and competence regarding trauma-informed practices in education settings. These findings are supported by previous studies. However, having average or above-average knowledge of trauma-informed practices and feeling relatively competent in implementing them is a good starting point for introducing a unit or a course on trauma-informed practices for pre-service teachers.

5 LIMITATIONS OF THE STUDY

These findings might be useful in developing university curriculums, syllabi, and/or individual units on trauma-informed practices in education. However, the study has several limitations the author would like to discuss. One of the greatest limitations of the study is its sample. The non-probability sample in this study might not be representative of the target population enough to generalize the results of the study. Hence, administering the study for a larger sample is one of the prospects of further studies. Another limitation is due to the Likert scale survey used in this study. Data collection depended solely on participants' understanding of statements and their sincerity in their answers. Participants might have also avoided extreme answers in the tool. The prospects for the following research on the perceptions of respondents regarding trauma-informed practices is employing a mixed-method research design.

6 CONCLUSIONS

This research aimed at identifying perceptions of pre-service teachers on their knowledge and competency in implementing trauma-informed practices. From the research that has been carried out, it is possible to conclude that pre-service teachers have mixed perceptions of their knowledge about trauma. They show varying levels of confidence in their knowledge about different aspects of trauma, its impact on students and behavioural difficulties associated with trauma.

Despite their mixed perceptions of knowledge around trauma, pre-service teachers feel relatively competent in implementing some trauma-informed practices. They expressed confidence in areas such as explaining trauma to students, establishing trust and safety, influencing positive behaviour and incorporating students' strengths and interests.

However, variability in participants' answers suggests the need for the implementation of trauma-informed practices into the syllabi and curricula of pre-service teacher training. The findings suggest that pre-service teachers are ready to learn about trauma-informed practices and it is necessary to incorporate trauma-informed teaching as an approach to pre-service teacher training and as a subject matter.

The author suggests teaching pre-service teachers the following topics on the trauma-informed approach: The notion of the trauma-informed approach to education; The neurobiology of trauma and its impact on people; Classroom management as a way to regulate individual students; Classroom management as a way to create a trauma-informed classroom space; and Approaches to building the trauma-informed supporting school environment. These topics can both give students the foundations of the trauma-informed approach and form necessary skills and attitudes to implement this approach in their classroom.

The findings are of direct directorial relevance for all providers of pre-service teacher training. Further research on comparing pre-service and in-service teachers' perceptions and attitudes of trauma-informed practices is necessary. Continuing research into the design and outline of curriculum preparing pre-service teachers to implement trauma-informed practices in Ukraine is fully justified because there is a need to adapt successful foreign practices to local realities and war settings.

ACKNOWLEDGEMENTS

The author would like to express her gratitude to participants of the study and the time they committed to the survey. This study was made possible with the informational support of libraries of the University of Minnesota Twin Cities, where the author was a visiting scholar in 2022-2023 academic year.

REFERENCES

(2023). Centre of the psychological health and psychosocial support of the National University of Kyiv-Mohyla Academy. https://www.ukma.edu.ua/index.php/science/tsentri-ta-laboratoriji/cmhpss.

(2024). War in Ukraine: Support for children and families. https://www.unicef.org/emergencies/war-ukraine-pose-immediate-threat-children.

Berardi, A. and Morton, B. (2019). *Trauma-Informed School Practices: Building Expertise to Transform Schools*. George Fox University Library. https://open.umn.edu/opentextbooks/textbooks/718.

Berger, E. and Martin, K. (2021). Embedding trauma-informed practice within the education sector. *Journal of Community & Applied Social Psychology*, 31(2):223–227. https://doi.org/10.1002/casp.2494.

Choice-Hermosillo, M. (2020). *Pivotal perceptions: A Phenomenological exploration of trauma-informed practices in an urban school*. PhD thesis, Morgridge College of Education, Teaching and Learning Sciences, Child, Family, and School Psychology. https://digitalcommons.du.edu/etd/1736/.

Drymond, M. J. (2020). *Examining role breadth, efficacy, and attitudes toward trauma-informed care in elementary school educators*. A thesis submitted in partial fulfillment of the requirements for the degree of Education Specialist, University of South Florida. https://digitalcommons.usf.edu/etd/8444/.

Forbes, H. T., Maki, D., and Lavoie, R. D. (2020). *Classroom180: A Framework for Creating, Sustaining, and Assessing the Trauma-Informed Classroom*. Beyond Consequences Institute.

Jakobson, M. (2021). An exploratory analysis of the necessity and utility of trauma-informed practices in education. *Preventing School Failure: Alternative Education for Children and Youth*, 65(2):124–134. https://doi.org/10.1080/1045988X.2020.1848776.

Khoruzha, L., Bratko, M., Hrynevych, L., Bozhynskyi, V., Nikolayev, Y., and Riy, H. (2023). Organization of the educational process in Kyiv schools during the war. Analytical report, Borys Grinchenko Kyiv University, Kyiv. https://don.kyivcity.gov.ua/files/2023/3/31/p2.pdf.

Kotenko, O. and Holovatenko, T. (2020). Models of foreign language primary school teacher training in the EU. In Jankovska, A., editor, *Innovative scientific researches: European development trends and regional aspect*, pages 92–115. Baltija Publishing. https://doi.org/10.30525/978-9934-588-38-9-5.

Metzinger, R. E. (2021). *Teacher perceptions of internal and external student behaviors and the impact of trauma-informed practices*. Dissertation in Partial Fulfillment of the Requirements for the Degree of Doctor of Education in Leadership and Professional Practice, Trevecca Nazarene University. https://www.proquest.com/openview/2c2b1084ce86be5a2583fecb4c805309/1?pq-origsite=gscholar&cbl=18750&diss=y.

Mikolajczyk, E. (2018). *School Staff Perceptions of a Trauma Informed Program on Improving Knowledge, Competence, and School Climate*. Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Psychology, Philadelphia College of Osteopathic Medicine. https://digitalcommons.pcom.edu/psychology_dissertations/473/.

Morton, B. M. and Berardi, A. (2018). Creating a Trauma-Informed Rural Community: A University–School District Model. In Reardon, R. M. and Leonard, J., editors, *Making a Positive Impact in Rural Places: Change Agency in the Context of School-University-Community Collaboration in Education*, pages 193–213. Information Age Publishing.

Operational Data Portal (2024). Ukraine Refugee Situation. https://data2.unhcr.org/en/situations/ukraine.

SAMHSA (2023). Understanding Child Trauma. https://www.samhsa.gov/child-trauma/understanding-child-trauma.

Taber, K. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48(6):1273–1296. https://doi.org/10.1007/s11165-016-9602-2.

Ukrinform (2023). Ukraine has officially registered 4,867,106 displaced people. https://www.ukrinform.ua/rubric-society/3649695-v-ukraini-oficijno-zareestruvali-4-867-106-pereselenciv.html.

Veach, J. A. (2021). *Childhood Trauma: A Qualitative Case Study of Elementary Educators' Attitudes and Perceptions*. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Education, Washington State University. https://doi.org/10.7273/000001863.

Venet, A. S. (2021). *Equity-centered trauma-informed education*. W.W. Norton & Company.

Vincent, S. (2020). *Educator perceptions in relation to the implementation of trauma-invested instructional practices*. PhD thesis.

Usage of Satellite Navigation Technologies in Schools Around the World

Igor Kholoshyn[1][a], Svitlana Mantulenko[1][b], Olha Bondarenko[1][c], Olena Hanchuk[1][d] and Iryna Varfolomyeyeva[1][e]

[1]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*
holoshyn@kdpu.edu.ua, mantulenkokdpu@ukr.net, bondarenko.olga@kdpu.edu.ua, ganchuk.olena@kdpu.edu.ua, iravarfolomeeva365@gmail.com

Keywords: GPS, Navigation, Geographic Teaching, GIS.

Abstract: The study of satellite navigation technologies in educational courses became common at the end of the 20th and the beginning of the 21st century. The practical use of satellite navigation for educational purposes was developed in 2000 and is actively used in the educational process in many countries. This problem has become especially relevant in technological progress when global positioning systems accompany people daily. In school life, satellite navigators are a powerful technical tool that opens new opportunities for learning and teaching. Satellite navigation provides an opportunity to familiarise students with the concept of coordinates and teaches them to orient themselves in the area both with the help of a map and compass and a navigator's help. In addition, the navigation device is a powerful tool for teaching geography, biology, history, and mathematics. It studies wild nature, compiles relief maps, and conducts local history research. Satellite navigation for game purposes has become widely used in school geographical education in Europe and the USA. Such educational and entertaining games include geocaching, geotating, and geographic crowdsourcing. At the same time, unfortunately, satellite navigation is not used correctly in the Ukrainian school geographic educational system.

1 INTRODUCTION

The study of satellite navigation technology within the context of educational courses in schools began in the late 20th to early 21st centuries. Geoinformation systems and remote sensing data of the Earth have already found widespread use in school instruction as crucial aspects of geoinformatics. The implementation of satellite navigation was delayed because of its primary military application. Access to civilian navigation receivers was restricted during this time (civilian use of GPS on USSR territory was outlawed until 1991). Before the year 2000, the US military used a method to determine coordinates that were not accurate and could result in errors of up to 100 meters.

On May 1, 2000, US President Bill Clinton announced the termination of the "Selective availability" mode. The United States government recognised GPS as a widely used technology in various industries, ranging from urban emergency services to mineral exploration. With the removal of restrictions, GPS users have significantly more accuracy in determining their geographic locations. That marked the practical development of satellite navigation's educational applications. Given that global positioning systems have become an essential aspect of professional activity in various scientific and economic disciplines, students must learn this type of geoinformation technology. As a technical teaching tool, the satellite navigator provides educators with an altogether new level of training and learning. It allows students to develop spatial thinking, which is critical for real-world perception (Kholoshyn, 2017).

2 METHODS

There are various examples of using satellite navigation in school classes in the literature today (Kholoshyn, 2014; Baker and White, 2003; Cooke, 2005; Demirci, 2009; Fang et al., 2007; Gomez, 2013; Lambrinos and Asiklari, 2014; Zarske et al., 2003). The authors propose several techniques and strategies

[a] https://orcid.org/0000-0002-2174-5605
[b] https://orcid.org/0000-0001-5673-0174
[c] https://orcid.org/0000-0003-2356-2674
[d] https://orcid.org/0000-0002-3866-1133
[e] https://orcid.org/0000-0002-0595-524X

Kholoshyn, I., Mantulenko, S., Bondarenko, O., Hanchuk, O. and Varfolomyeyeva, I.
Usage of Satellite Navigation Technologies in Schools Around the World.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 138-147
ISBN: 978-989-758-579-1

for incorporating satellite navigation technology into the educational process. Effective use of this technology in school instruction requires understanding its historical development, advanced pedagogical experience, and careful consideration of the challenges during its implementation.

Therefore, in our opinion, it is necessary to study and analyse the existing experience to promote and widely implement satellite navigation technologies in the educational process of modern schools.

Research object: Analyse the existing worldwide and domestic experience of using satellite navigation in educational institutions and consider the possibilities of its implementation in the practice of modern schools.

3 RESULTS AND DISCUSSION

Satellite navigation was only taught theoretically in schools worldwide until the beginning of the 21st century. The United States of America was at the forefront of this field for an extended period. The study of place is one of the five essential themes with priority in the K-12 geography curriculum of the United States education system, according to the "Guidelines for Geographic Education" adopted by the Joint Committee on Geographic Education in the United States in 1984 (Brooks, 2006). Hill (1989), an American scientist and head of the Center for Geographic Education at the University of Colorado, discovered that location may be determined at two levels: absolute and relative. Absolute location involves determining geographic coordinates (latitude and longitude), while relative location involves determining an object's position relative to other larger or prominent objects. In this aspect, GPS technologies were initially studied in schools in the USA.

A complete lesson for teaching satellite navigation in high school, produced by researchers at the University of Colorado's Navigation Institute (USA), is an example of such an approach. The program included ten standard lessons for students of different ages and levels of preparation (Zarske et al., 2003). The lessons were designed for middle school teachers during regular and extracurricular activities. While analysing the content of the lessons (table 1), it should be noted that the program has a general theoretical orientation, with more than half of the lessons (6 out of 10) dedicated to the fundamentals of cartography. In contrast, others cover satellite navigation operations and application principles. Most courses are theoretically linked but can also be taught individually – students can select topics based on their interests.

The program's key feature is its ability to be easily integrated into the existing curriculum of middle school education in the United States. While most planned courses are directed towards 7th-grade students, they are equally appropriate for use in younger and older schools.

Satellite navigation further evolved into a practical component. Many K-12 standard middle school teachers in the US educational system have increasingly started using GPS receivers during their lessons. However, initially, the application of navigators was dominated by a limited technological approach, where teachers focused solely on teaching students how to operate these devices during the sessions.

Table 2 show an example of this approach using GPS navigators in geography classes by Ninno and Kuhl (2002). The lesson plan analysis indicates that the lesson's primary focus is teaching students how to determine geographical coordinates using the navigator and finding points based on known coordinates.

Later, Tim Cresswell's research improved the subject of establishing location by satellite navigation in school geography. Cresswell (2013) illustrated the importance of broadening educational options for determining the position of various geographical objects. Determining geographical coordinates should not be considered as an aim in itself. Moreover, the prospect of doing extensive research on territories with precise coordinates should be acknowledged. These can include physical landscapes, natural resources, cultural qualities of individuals, and so on (Brooks, 2006).

The statements of Hill (1989) also support the significance of this approach: "Geography is not just about places and names – capitals, countries, and rivers, but rather an entire science about the significance of location." Only in this way can we transition from memorising the names of countries, capitals, and other dry figures and dates to analysing the relationship between humans and the surrounding environment.

This detailed territory analysis converts theoretical knowledge into practical applications. According to Morgan (2003), a renowned British geographer, enhancing spatial literacy contributes to students' active life perspectives, develops their practical problem-solving skills, and opens their eyes to the real world.

The importance of this approach is confirmed by the conclusions drawn independently by Favier and van der Schee (2014), Mitchell et al. (2018), Nielsen et al. (2011), and Osborne et al. (2020). In their works, the authors provide examples of how pupils and students using GIS technologies develop skills

Table 1: Lessons of the comprehensive program for studying satellite navigation in middle school (Zarske et al., 2003).

Lesson title	Lesson description
Where are we?	It contains essential navigation information, such as relative and absolute location, latitude, longitude, cardinal directions, and working with a map and compass.
Becoming a Great Navigator	Discusses the history of the development of navigation methods.
Navigation by Numbers	Demonstrates the role of mathematics in navigation.
Doing it Right!	Discusses faults that limit location accuracy and the function of computers in navigation.
Topographic Map Mania	Provides information on how to read topographic maps and navigate using them in the terrain.
Reaching the Point	The teacher demonstrates how to determine a location using triangulation and practically shows how to locate objects on a map, in the classroom, and in the field.
On Land, Sea, and Air	Shows how navigational techniques expand the possibilities for world travelers and introduces students to various navigation methods.
Satellite-Speed Navigation	Explores the fundamentals of the Global Positioning System (GPS), including trilateration and the use of the speed of light to determine distances to satellites.
GPS in Motion	Discusses the use of GPS receivers for determining location coordinates.
Not Lost in Space	Describes the movements of planets and spacecraft in Earth's orbits, which are used in navigation.

and abilities in solving problem-based tasks related to situations that may arise in real life. Learning based on these technologies encourages independent problem-solving or self-inquiry, which is considered a challenge in geography education (Piotrowska et al., 2019).

As Cooke (2005) rightly pointed out, "Instead of trying to fit GPS and GIS into the curriculum, simply present them as technologies that need to be learned alongside text processing, spreadsheets, the internet, digital photography, or video editing". Gomez (2013) shares a similar viewpoint, emphasising that educators should not teach students 21st-century skills but rather use 21st-century skills in the teaching process. In other words, teachers should focus on something other than teaching students how to use a navigator but actively employ its functional capabilities in the educational process.

For example, Broda and Baxter's research demonstrated how GPS devices can be employed in the classroom to create an atmosphere where students actively investigate their surroundings (Broda and Baxter, 2003).

Navigation devices, utilising the motivational possibilities provided by this technology, disrupt the monotony of everyday classroom learning, promote the use of critical thinking skills in students, and enhance their understanding of geographical concepts (Bednarz et al., 2006).

As a result, despite the navigator's association with geographical tools, many teachers in related subjects have actively begun to use it in their classes. Historians, biologists, physicists, and mathematicians are among those included.

For instance, Baker (2001) shows how a navigation receiver may become a valuable ally for geography, biology, mathematics, and history professors undertaking scientific studies in various areas. The author demonstrates how Minnesota students use satellite navigation to investigate wildlife, research Civil War history, record student movements on the school-home route, and much more.

Overall, the geographical component of using satellite navigation is actively employed by modern educators. For example, Lambrinos and Asiklari (2014) from the Center for Advanced Digital Earth Experience utilised GPS technologies in extracurricular geographical research projects with students from grades 4 to 6. The tasks assigned to the students included determining the coordinates of historical objects using a navigator and plotting them on a paper map at a scale of 1:20000. This allowed students to become familiar with the concept of coordinates, learn how to orient themselves in the terrain using both a map and a compass, as well as understand the principles of global positioning systems. The project resulted in a paper map of the region constructed by the students and a GIS project of positioning historical objects in the ArcGIS environment (Lambrinos and Asiklari, 2014). The use of satellite navigation technologies allows students to be involved in solving real-world problems in an integrative and excit-

Table 2: Lesson plan: GPS navigation and map reading (Hill, 1989; Ninno and Kuhl, 2002).

Lesson content	Student actions	Teacher actions	Materials for the lesson
Introduction by the teacher	Listen to the teacher	Explains the purpose and content of the lesson	Presentation slides in MS PowerPoint
What is GPS and its role in GIS	Listen to the teacher	Explains the basics of GPS and GIS, their relationship, and applications	Presentation slides in MS PowerPoint
Critical functions of GPS Waypoints	Listen to the teacher	Describes the main operations with the Garmin navigator	Presentation slides in MS PowerPoint. Garmin navigator
Navigation actions Waypoint Creation Function. Determination of the Waypoint Name. Navigation to the Waypoint using the "Goto" Function.	Navigation to the Waypoint is using the "Goto" Function. 1. Students follow individual directions. 2. They determine a waypoint and give it a name. 3. Using the "Goto" function, they navigate to the waypoint. 4. After reaching the waypoint, they return to the base.	1. Provides instructions for the navigation task decision. 2. Teacher 1 stays at the base. 3. Other teachers accompany students and ensure compliance with safety rules. 4. Monitors the recording of waypoints.	Garmin navigator. Information cards
Putting GPS points on the map	1. Listen to the teacher. 2. Put the waypoints on the map.	1. Check the correctness of the waypoint. 2. In case of incorrect execution of the task, achieve its repetition.	Printed maps
Navigation actions 2 Create a waypoint with coordinates from the map. Navigate to a waypoint using the "Goto" function.	1. Determine and write out the coordinates of an object from the map. 2. Enter the waypoint in the navigator. 3. Using the "Goto" function, go to the specified waypoint 4. Define the waypoint in the navigator. 5. Zoom in and estimate the difference between the positions of the specified points.	1. Check the correctness of the coordinates. 2. Teacher 1 is at the base. 3. Other teachers accompany students and monitor compliance with safety rules. 4. Explains possible reasons for the discrepancy between the waypoints.	Garmin navigator. Information cards. Printed maps
Quizzes	Listen to and discuss the results of the lesson with the teacher	Discusses the results of the practical part	Part of the presentation in MS PowerPoint

ing manner. For example, elementary school students in Rochester, New York, USA, gather and geographically evaluate water quality data (temperature, pH level, dissolved oxygen and phosphate levels, and other indicators) from rivers flowing into Lake Ontario using global positioning systems. As a result of their efforts, they identified and outlined many contamination zones (Harshman, 2008).

High school students in Syracuse, New York, USA, actively employ navigators in area geological research. Other intriguing initiatives include charting the position of trees on school grounds and providing specific information such as species, size, and projected age. Socioeconomic studies, which include

finding vacant or abandoned dwellings and monitoring road sections with poor pavement conditions, can benefit local governments.

Kerski (2003) explained how geography students might use navigators to calculate the circumference of the Earth. The activity is simple and informative, based on calculating the length of one second of latitude.

Harshman's way of building a local terrain profile with a navigator is also intriguing. It entails students using GPS receivers to follow predetermined routes and determine the absolute elevation of checkpoints every 5 meters. It is possible to generate a map of the terrain relief by organising the routes radially from a central point (Harshman, 2008).

Most educators agree that many programs produced within the scope of national educational standards in various nations must effectively teach satellite navigation in traditional classroom formats. As a result, it is advised to actively participate in extracurricular activities such as optional courses and clubs.

Table 3 provides a brief overview of the recommended tasks for learning GPS navigation in the geographical elective course in secondary school, according to American educators (Baker and White, 2003). The following key points, embedded by the authors in the elective program, deserve attention:

- The successful integration of tasks aims to equip students with theoretical and practical skills in using GPS receivers at various application levels.
- The field component of the training includes working with the navigator, learning terrain orientation techniques, and conducting an in-depth investigation of the surrounding area.
- The GPS data is processed using the ArcGIS GIS program.

We should point out that satellite navigation is already being used in schools in Africa and Asia with a low level of economic development despite a need for more critical technical resources. For example, Nigerian researchers (Mba et al., 2017) highlighted the potential of GPS navigation in teaching mathematics and natural sciences, including:

- Creating a map of the school and its surroundings.
- Geocaching.
- Locating various institutions (e.g., examination centres).
- Determining the elevation of different points in the area, and more.

Social media and dedicated websites play a vital role in promoting satellite navigation as an essential technology in education. Because of the popularity of these platforms among young people, new enthusiasts might be engaged in modern technology knowledge. Amos Gikunda's Grind GIS website is a beautiful example of educational work since the author offers numerous facets of geographic knowledge gained by geographic information systems (Grind GIS, 2023) quickly and unobtrusively. He highlights the benefits of adopting this technology in teaching by describing the theoretical and practical features of global positioning systems, including:

1. Increased study accuracy and reliability, particularly during field learning.
2. Visual representation of the acquired results.
3. Inclusion of cutting-edge technologies in the classroom.
4. Facilitating the learning process's mobility.
5. Improving students' everyday safety.
6. Gamification in the classroom.
7. Making inter-disciplinary links.
8. Improving computer literacy, among other things.

Overall, the analysis of methodological studies (Albion, 2015; Anunti et al., 2020; Osborne et al., 2020) shows that preliminary training of teachers is necessary for the effective use of satellite navigation technologies in the educational process. Thanks to this, the teacher can develop methods and forms of implementing geospatial technologies in the learning process. As an example, we can cite the recommendations given by Mašterová (2023):

- deal with local problems related to the area around the school and home as a start that can lead to observing other areas later;
- involve fieldwork;
- deal with problems relevant to the learner;
- involve group learning;
- involve prior teacher training (e.g., through workshops), which is essential;
- acknowledge this teaching is time-consuming;
- involve long-term and frequent inclusion of GSTs in teaching, which has benefits; and
- involve a choice of web-based tools, as these are advisable.

The widespread use of gamification technologies is one of the most defining elements of school geography in European countries, particularly in the United States. Satellite navigation has not gone unnoticed

Table 3: A brief overview of the recommended tasks for learning GPS navigation in the geographical elective course in secondary school (Baker and White, 2003).

Name of the task	Purpose of the task	Content of the work
Working with a world map	Updating knowledge about latitude and longitude, teaching teamwork skills	Working in groups of 3 - 4 students: They are playing a game to find the most important objects (cities) using geographic coordinates on the world map.
Introduction to GPS technology, map reading, observation, and data collection	Acquiring practical skills in using a GPS device	Determining geographic coordinates on the school premises, locating places specified by the teacher using the GPS device.
GPS surveying of the area	Learning to conduct surveys of the territory using a GPS device, observing the environmental conditions	Based on the geographic coordinates and data obtained with the GPS device, learning to orient oneself in the area (in the park zone), conducting ecological observations (photography, counting, etc.)
Creating a comprehensive map of the area	Learning to create a map of the locality based on data obtained with the GPS device and eco-geographical observations using GIS	Analysing data collected in groups during the GPS survey of the area, constructing an all-encompassing map of the park's territory utilising ArcGIS, and assessing the knowledge gained by students.

by researchers and educators. The emphasis on gamification surely helps the Global Positioning System (GPS)'s appeal among students.

One of the most common educational games is geocaching. Implementing this technology broadens the educational area beyond the typical classroom. American scientists and educators have contributed to creating educational geocaching, including Christie (2007) and Spencer (2015).

The global development of geocaching has resulted in the emergence of "educational geocaching," an innovative method of teaching, playing, and competing. It includes locations of rare plant species (populations), geological landmarks, natural and cultural monuments, historical sites, and other educational geocache points. Our knowledge of educational geocaching helps us to define its organisational characteristics.

Educators initially hide small caches in convenient locations such as parks, squares, and school premises in this game. Students are divided into teams using a smartphone with a GPS module and a route sheet containing 10-20 waypoint coordinates. Although the coordinates and route sheets are identical for all teams, they start from different locations, determining their route and the order of finding the waypoints.

The game aims to find the maximum number of waypoints and answer the questions hidden at these points in the shortest possible time. Each found waypoint earns the team 1 point. Additionally, a team can earn two bonus points by correctly answering one of the questions. Each waypoint has a "thematic" question, and teams send their answers to the teacher via SMS, who then determines their correctness.

The educational geocaching questions posed to participants are divided into four categories:

1. *Questions about attention and search activity*. Answers to these questions demand attentiveness and observation. For example, if an old photograph is attached to the question, determining the answer to "What in this photo does not correspond to reality" will necessitate the discovery of objects that appeared or disappeared in that region.
2. *Questions on geography that will test student's knowledge*. The teacher verifies students' basic geographical knowledge in an easy-to-understand manner. For example, "Identify the type of soil in the area of the waypoint."
3. *Questions about knowledge of the local area*. Teams search for the answer to "What was here before?" that assumes that the participants either know the history of these places themselves or find out from residents, for example, "Why is this place called 'Smychka'? Why is the street called?" and so on.
4. *Local measurement questions*. The GPS receiver's capabilities can be used to get the answers

to these queries. For instance, the "Area Calculation" feature on the GPS calculates the square's area.

Several variables affect how educational geocaching is conducted, but the following stand out:

1. *Age of students, team composition, and their level of preparation*. The instructor must consider the participants' varying ages when selecting the sites of the caches and creating the questions. The student's technical proficiency, physical prowess, and subject understanding should also be considered when forming teams. Students with leadership experience, skill, and authority should be chosen to lead teams.
2. *Number of participants*. Suppose more than 3–4 teams per educator; control over the game's development may be lost.
3. *Type and quantity of available GPS receivers*. The number of participating teams is based on the number of navigators. Each group should preferably have equivalent equipment to provide equitable conditions.
4. *Availability of computers and Internet access*. Participants must have unrestricted access to computers and the Internet to appropriately prepare and process game results.
5. *Venue selection*. The teacher should carefully select the area where the game will be played. The students should be as safe as possible, and at the same time, it should make it possible to position the caches effectively. The teacher should pay particular attention to the students' safety during the exercises. That includes enforcing rigorous geocaching time limits (which include rest breaks), hiding caches in secure locations, being in regular mobile contact with groups, setting geographic boundaries for the game, etc.
6. *Season and weather conditions*. Since it is an outdoor activity, the weather dramatically impacts how it goes. Before conducting geocaching, the teacher should consider the climatic and meteorological circumstances.

Indeed, the use of gamification technologies in the educational process with the application of satellite navigators is not limited to geocaching. For example, various games are hosted on the GPSgame website, such as Geodashing Golf, GeoVexilla, GeoDashing, GeoPoker, and others. Despite their diversity, all these games share a common foundation – the use of satellite navigation. For instance, Geodashing Golf is a game where players use GPS receivers to navigate to 18 randomly located waypoints. The result depends on how accurately and closely the participant approached each "hole." The winner is the one who, like in golf, visited all 18 virtual holes at the closest distance to them.

Geotagging is another method of using GPS navigators in education that is strongly tied to social media platforms. It is based on using the GPS coordinates of a location as keywords to identify where a picture was shot. Each digital snapshot is given a spatial value and a time value. For instance, the web service Geobloggers (https://www.flickr.com/groups/16736639@N00/) combines the digital map features of maps.google.com with the capabilities of the Flickr.com photo service.

Geographic crowdsourcing is a relatively recent approach to using navigation in education. It entails using students' collective intelligence to produce knowledge that has enormous practical value. An experiment that Google ran in numerous Indian cities exemplifies this. Free GPS navigators were distributed to the populace, and they were tasked with noting the whereabouts of every notable landmark they came across in the city. The object was added to the map if data from numerous sources was available. In a short time, comprehensive city maps were made, showing landmarks, restaurants, government offices, and other structures.

GPS drawing is possible by fusing artistic ability, spatial awareness, and navigational understanding. Its core involves students following a predetermined path while using GPS, and their track points create a precise pattern on the device's screen. Individual words, complete sentences, silhouettes of people, animals, other objects, and more can all be included in the drawing, which is decided upon by the participants themselves. Any activity (including walking, running, skiing, cycling, and driving) can be used to create a drawing.

When describing the use of satellite navigation in Ukraine's educational system, it should be noted that the lengthy ban on open access to the navigation system and the high price of receivers severely limited the application of this cutting-edge technology in domestic and international scientific, technical, and educational spheres. Since 2007, there has been a noticeable increase in interest in satellite navigation, partly due to the introduction of smartphones with GPS capabilities. Therefore, Satellite receivers are increasingly used in schools' teaching and learning processes.

Involving students, teachers, and working scientists in the international science and education program GLOBE (Global et al. to Benefit the Environment), which gained popularity in the early

2000s, was the first time GPS navigators were used in Ukrainian classrooms. Participants in the program received GPS receivers, the cost of which frequently exceeded the monthly budget of a tiny rural school. These receivers were used to identify the coordinates of locations for undertaking ecological measures and climate observations. The Astronavigation Consortium of Universities (UNAVCO) provided technical support and navigator rental services. Participants of this program learned how to use satellite navigators, which ultimately stimulated interest in satellite global positioning technologies among teachers and students.

Summarising our own experience of using satellite navigation technologies in the practice of modern schools, we can draw the following conclusions.

The introduction of satellite navigation systems into the educational process of a modern school can be achieved by the following steps:

1. Inclusion of satellite navigation technologies in the curriculum of school geography courses.
2. Development and use of educational situations and tasks with the use of satellite navigation both in the classroom and in extracurricular activities (scientific picnics, travel lessons, game lessons).
3. Preparation of research projects using navigation systems.
4. Conducting optional classes and geoinformation clubs.

The theoretical and practical component of satellite navigation is an integral part of geography courses: General Geography, Grade 6, Section II Earth on the Plan and Map; Ukraine in the World: Nature, Population, Section I Geographic Map and Work with it; Geographic Space of the Earth, Section I Cartography and Topography. However, this technology should not be limited to these courses only; it should be used as a "cross-cutting" technology throughout the entire geography course through research tasks and game technologies using navigation systems.

During classes and practical work in the field and extracurricular activities, students acquire knowledge about the history of satellite navigation; the structure of the main types of navigation receivers; acquire the ability to determine geographical coordinates using a navigator; solve various applied spatial problems (finding objects by coordinates, laying routes, saving and analysing tracks, etc.)

The tasks for students can be of the following nature:

1. Measuring the Earth's circumference using a GPS navigator;
2. Finding objects by geographical coordinates using a navigator.

To perform the relevant tasks, you can use smartphones with navigation applications (*My Location – GPS Coordinates, GPS Coordinates, My GPS Location*, etc.).

As part of the optional course "Cartography with the Basics of Topography," students learn to work with a digital compass. The digital compass, tied to a satellite signal, determines which way the navigator is turned and displays the data on the receiver screen. In addition to its high accuracy, unlike the magnetic compass, the compass in a satellite navigator has a very important practical function – demonstrating a bearing or course to determine the direction of movement. The compass arrow is a bearing or course indicator of the destination. This function is very useful in solving various spatial orientation tasks.

When performing a polar survey, the navigator is used to accurately determine the locations of points (stations) from which azimuth measurements are made and their relationship to each other. Having recorded the coordinates of the stations and stored them in the receiver's memory in klm format, students in the classroom can easily visualise them using the *Google Earth* geo-service on a computer screen. Then, using a printer, they print the base of the plan, on which all the stations are marked in compliance with all cartographic requirements. Later on, all the results of angular and linear measurements are plotted on this base.

Satellite navigation is actively used in various thematic and scientific studies that require determining the exact location of research points. To improve the quality of student research, navigators should be used in regional hydrological and geological studies and socio-economic studies, such as mapping dilapidated buildings, fixing road sections with poor pavement conditions, etc. Also, navigators and navigation maps are essential attributes of various local history and tourist educational excursions.

Thus, satellite navigation technologies have significant didactic potential in the study of geography and the development of key competencies of primary and secondary schools and contribute to the development of intellectual abilities, spatial thinking, and a holistic view of the world around us.

4 CONCLUSIONS

The conducted research allows us to draw the following conclusions:

1. Satellite navigation is quite actively used in the educational process in many countries of the world, and domestic education system has significant didactic potential but requires a systematic and well-founded methodological approach to this process.
2. Introducing satellite navigation technologies in world education is based on a research approach. Hence, using existing experience in introducing satellite navigation into school education is the key to obtaining the best pedagogical result.
3. Satellite navigation is most successful in countries with a comprehensive GIS education approach.
4. We see further development of scientific research in developing an educational and methodological complex for introducing satellite navigation technology into the school educational process based on the analysis of world and domestic experience.

REFERENCES

Albion, P. (2015). Project-, problem-, and inquiry-based learning. In Henderson, M. and Romeo, G., editors, *Teaching and Digital Technologies: Big Issues and Critical Questions*, pages 240–252. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9781316091968.024.

Anunti, H., Vuopala, E., and Rusanen, J. (2020). A Portfolio Model for the Teaching and Learning of GIS Competencies in an Upper Secondary School: A Case Study from a Finnish Geomedia Course. *Review of International Geographical Education Online*, 10(3):262–282. https://doi.org/10.33403/rigeo.741299.

Baker, T. R. (2001). Success with GPS: Handheld devices for the classroom. *The Science Teacher*, 68(12):39–41. https://www.researchgate.net/publication/265511068.

Baker, T. R. and White, S. H. (2003). The Effects of G.I.S. on Students' Attitudes, Self-efficacy, and Achievement in Middle School Science Classrooms. *Journal of Geography*, 102(6):243–254. https://doi.org/10.1080/00221340308978556.

Bednarz, S. W., Acheson, G., and Bednarz, R. S. (2006). Maps and Map Learning in Social Studies. *Social Education*, 70(7):398–404. https://www.socialstudies.org/system/files/publications/articles/se_700706398.pdf.

Broda, H. W. and Baxter, R. E. (2003). Using GIS and GPS Technology as an Instructional Tool. *The Social Studies*, 94(4):158–160. https://doi.org/10.1080/00377990309600199.

Brooks, C. (2006). Geographical Knowledge and Teaching Geography. *International Research in Geographical and Environmental Education*, 15(4):353–369. https://doi.org/10.2167/irg200.0.

Christie, A. (2007). Dr. Christie's GPS and Geocaching Guide for Educators. https://www.alicechristie.org/geocaching/.

Cooke, D. (2005). *Fun with GPS*. ESRI Press.

Cresswell, T. (2013). *Geographic Thought: A Critical Introduction*. Wiley-Blackwell.

Demirci, A. (2009). How do Teachers Approach New Technologies: Geography Teachers' Attitudes towards-Geographic Information Systems (GIS). *European Journal of Educational Studies*, 1(1):43–53. https://www.researchgate.net/publication/228343724.

Fang, R.-J., Su, K.-I., Lu, H.-C., Wang, C.-C., and Lin, C.-C. (2007). Application of Global Positioning System (GPS) in Earth Sciences teaching. In *Proceedings of the 6th WSEAS International Conference on Applied Computer Science, Hangzhou, China, April 15-17, 2007*, pages 267–271. https://www.researchgate.net/publication/238107847.

Favier, T. T. and van der Schee, J. A. (2014). The effects of geography lessons with geospatial technologies on the development of high school students' relational thinking. *Computers and Education*, 76:225–236. https://doi.org/10.1016/j.compedu.2014.04.004.

Gomez, M. (2013). GPS and Geography: Technology to Apply Geography with Middle-Grade Students. *Social Studies Research and Practice*, 8(2):43–54. https://doi.org/10.1108/SSRP-02-2013-B0003.

Grind GIS (2023). GIS and Remote Sensing Blogs, Articles, Tutorials. https://grindgis.com/.

Harshman, S. (2008). Transect Mapping with GPS. https://agic.az.gov/agic/sites/all/themes/AGIC/files/TransectMapping.pdf.

Hill, A. D. (1989). Rediscovering Geography: Its Five Fundamental Themes. *NASSP Bulletin*, 73(521):1–7. https://doi.org/10.1177/019263658907352102.

Kerski, J. J. (2003). The Implementation and Effectiveness of Geographic Information Systems Technology and Methods in Secondary Education. *Journal of Geography*, 102(3):128–137. https://doi.org/10.1080/00221340308978534.

Kholoshyn, I. (2017). Using of satellite navigation in the process of geoinformation competences formation of pupils on geography lessons. *Journal of Information Technologies in Education (ITE)*, (31):81–94. http://ite.kspu.edu/index.php/ite/article/view/64.

Kholoshyn, I. V. (2014). *Pedahohichna heoinformatyka [Pedagogical geoinformatics]*, volume 2. [Satellite navigation]. Vydavets FO-P Cherniavskyi D.O., Kryvyi Rih. https://elibrary.kdpu.edu.ua/handle/123456789/3926.

Lambrinos, N. and Asiklari, F. (2014). The introduction of GIS and GPS through local history teaching in primary school. *The European Journal of Geography*, 5(1):32–47. https://www.researchgate.net/publication/261622478.

Mašterová, V. (2023). Learning and teaching through inquiry with geospatial technologies: A systematic review. *European Journal of Geography*, 14(3):42–54. https://doi.org/10.48088/ejg.v.mas.14.3.042.054.

Mba, T. W., Abdurraheem, M. I., and Ayegba, A. (2017). Application of GPS Technology in Education. *International Journal of Trend in Research and Development*, 4(3):338–340. https://www.ijtrd.com/papers/IJTRD8595.pdf.

Mitchell, J. T., Roy, G., Fritch, S., and Wood, B. (2018). GIS professional development for teachers: lessons learned from high-needs schools. *Cartography and Geographic Information Science*, 45(4):292–304. https://doi.org/10.1080/15230406.2017.1421482.

Morgan, J. (2003). Imagined Country: National Environmental Ideologies in School Geography Textbooks. *Antipode*, 35(3):444–462. https://doi.org/10.1111/1467-8330.00334.

Nielsen, C. P., Oberle, A., and Sugumaran, R. (2011). Implementing a High School Level Geospatial Technologies and Spatial Thinking Course. *Journal of Geography*, 110(2):60–69. https://doi.org/10.1080/00221341.2011.534171.

Ninno, A. and Kuhl, J. (2002). Having with GPS. *Monitoring Times*, 21(8):14–16. https://www.worldradiohistory.com/Archive-Monitoring-TImes/2000s/Monitoring-Times-2002-08.pdf.

Osborne, Z. M., van de Gevel, S. L., Eck, M. A., and Sugg, M. (2020). An Assessment of Geospatial Technology Integration in K–12 Education. *Journal of Geography*, 119(1):12–21. https://doi.org/10.1080/00221341.2019.1640271.

Piotrowska, I., Cichoń, M., Abramowicz, D., and Sypniewski, J. (2019). Challenges in Geography Education – A Review of Research Problems. *Quaestiones Geographicae*, 38(1):71–84. https://doi.org/10.2478/quageo-2019-0009.

Spencer, A. (2015). Hide-and-seek in macquarie university library: geocaching as an educational and outreach tool. *The Australian Library Journal*, 64(1):35–39. https://doi.org/10.1080/00049670.2014.985179.

Zarske, M. S., Axelrad, P., Yowell, J. L., and Sullivan, J. (2003). Lessons in Navigation for Middle School Students. In *ION GNSS 2003, Portland, OR, September 9-12, 2003*, volume 4, pages 1–8. http://web.archive.org/web/20170811230712if_/https://itll.colorado.edu/images/uploads/about_us/publications/Papers/Zarske_ION_GNSS03_Education_FINAL.pdf.

Experimental Verification of Using Augmented Reality Technology for Teaching Global Reading to Preschoolers with Autism Spectrum Disorders

Tamila Kolomoiets[1][a], Olena Bielikova[1][b] and Anna Kurienkova[1][c]
[1]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*
tamilak2561@gmail.com, efb@ukr.net, ann.kurenkova.91@gmail.com

Keywords: Correctional Education, Children With Autism Spectrum Disorders, Preschoolers, Augmented Reality Technology, Global Reading, Alternative Communication.

Abstract: The article focuses on the use of augmented reality technology for visualizing educational information for children with ASD during teaching global reading and systems of Augmentative and Alternative Communication (AAC). It is noted that while learning, children with ASD display such features as quick fatigue, low concentration, constant distraction and difficulties in building communications. Based on the developed and tested corrective- developmental methods, an algorithm for forming a technology for teaching global reading to children with ASD was defined. The main stages of such training were determined: 1) creation of "safe" interaction for the child; 2) learning to select the inscriptions under the pictures (if the child pronounced the name correctly, he was offered to "revive" the picture with the help of augmented reality technology); 3) selection of words for objects (pictogram images), verbs (the cat begins to move – runs); 4) work with individual handouts: compose sentences and read aloud; 5) use of PECS alternative communication (cards have inscriptions) – children fix visual image of the word; 6) using a mnemonic table in augmented reality for reading. The stages of an empirical study of the effectiveness of teaching global reading to children with ASD using augmented reality technology were defined. An empirical research program was developed, which included problem-search, diagnostic, empirical-synthesizing and interpretive-summary stages. For each stage, the main achieved results were formulated and research methods were substantiated. The main technical possibilities of using augmented reality technology in teaching global reading to children with ASD were characterized. The results of diagnostics of children with ASD before and after the experiment were presented. Empirical data were compared and a conclusion was drawn about the effectiveness of the proposed methodology for teaching global reading to children with ASD.

1 INTRODUCTION

In the context of shaping the European-oriented development of the educational space in Ukraine, against the backdrop of the existing challenges in teaching and nurturing children with mental developmental disorders, the utilization of modern information and communication technologies in pedagogical activities gains significant relevance. In Ukraine, as well as globally, there is a gradual quantitative increase in children with Autism Spectrum Disorder (ASD). According to international research, Ukraine ranks 96th in terms of the prevalence of ASD worldwide (Wisevoter, 2023). Thus, Ukraine is home to 160,444 individuals with ASD, out of which 31,617 are children. The prevalence rate of childhood autism is 463.9 per 100,000.

The increasing trend of ASD prevalence in Ukraine and globally has prompted experts to search for new methodologies and technologies for educating and developing this category of children.

Given the reform of the domestic education system and the inclusion of children with ASD in the mainstream educational framework, the acquisition of communication skills and appropriate socialization become even more pressing issues. It should be emphasized that the diagnostic criteria for Autism Spectrum Disorder include a triad of symptoms that manifest by the age of three (Wetherby et al., 1998):

1) disorders in social interaction;

[a] https://orcid.org/0000-0002-7321-0901
[b] https://orcid.org/0000-0001-7074-5030
[c] https://orcid.org/0000-0001-9131-933X

Kolomoiets, T., Bielikova, O. and Kurienkova, A.
Experimental Verification of Using Augmented Reality Technology for Teaching Global Reading to Preschoolers with Autism Spectrum Disorders.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 148-155
ISBN: 978-989-758-579-1

2) disorders in verbal/non-verbal communication;
3) repetitive, stereotyped, restricted behavior and activities.

Consequently, the acquisition of communication skills for children with ASD is among the most crucial matters, as they not only encounter difficulties in communication and language but also challenges in understanding and utilizing non-verbal behavior in communicative interactions.

It is worth noting that one of the means to develop communication skills and enhance a child's vocabulary is through reading instruction. However, we understand that the process of reading is complicated for children with ASD due to their limited language function. In our study, we will focus on the utilization of augmented reality technology for visualizing educational information during global reading instruction and for augmentative and alternative communication (AAC) systems. Visualization of educational information relies on visual memory and is well-suited for children with ASD.

2 RELATED WORK

The issue of teaching children with autism spectrum disorders is being studied by many researchers, including Ukrainian ones (Ostrovska et al., 2018; Tarasun, 2022; Khvorova, 2011; Skrypnyk and Lozova, 2020; Shulzhenko, 2009; Romanchuk, 2016; Sinyov, 2007; Shevtsov, 2009).

In particular, Tarasun (2022) and Khvorova (2011) were engaged in the study of issues related to the development, education, and socialization of children with autism. They developed contemporary medical-psychological-pedagogical and neuropsychological approaches to the study of Autism Spectrum Disorders (ASD) and created authorial techniques for diagnosing the development peculiarities of children with autism. They proposed a system for intensifying the development correction of children with ASD, including various approaches, a roadmap for autologic assistance, and methods for correcting the socio-emotional and communicative-language development of children with ASD. Skrypnyk and Lozova (2020) developed a methodology for the formation of the communicative and language sphere of preschool children, known as 'Sensory Integration Ayres' and 'Sensory Diet,' which are methods based on the ideas of the regularities of development and active participation in life activities. Shulzhenko (2009) examines the issues of psycholinguistic aspects of speech peculiarities in children with autistic spectrum disorders and proposes approaches to studying the genesis of the speech phenomenon within the mental structure of autistic children.

Based on foreign research (Bonora et al., 2019; Light and McNaughton, 2012; Stone, 2004), it is possible to distinguish two categories of deviations of social and communicative development in children with ASD, namely: the ability to divide attention, which is associated with difficulties in coordinating attention between people and objects; and the ability to use symbols, which is associated with the difficulties of conventional symbolic meanings and affects acquisition of speech, the use of gestures and game actions (Stone, 2004).

In addition, the issue of implementation and verification of the effectiveness of modern AAC systems becomes urgent. The international experience of rehabilitation practice shows wide use of AAC tools (reading books and communication boards, glyphs) and their general applicability due to their high practical usefulness (Bonora et al., 2019). However, the use of augmented reality for teaching global reading to children with ASD is a unique development of its kind, the ultimate goal of which is formation of children's oral speech.

The development and utilization of augmented reality for teaching children with ASD, especially global reading, is a unique innovation aimed at enhancing children's oral communication skills. The AR technology relies on the visual memory of children with autistic spectrum disorders, which is well understood by them due to the combination of graphic word representation with a real object. The rationale for employing augmented reality technology in teaching ASD children global reading was substantiated in our previous publication (Tarasun, 2022). The logical continuation of our work will entail highlighting the practical results of the experimental research on the application of AR technology in teaching global reading to children with ASD.

Research objective: to experimentally assess the effectiveness of augmented reality technology in teaching global reading to preschoolers with ASD through the use of augmented reality technology and Alternative and Augmentative Communication (AAC).

The article uses the *methods* of analysis, comparison, systematization, experiment, diagnostics according to the CARS and PEP-R methods, the method of mathematical data processing, data generalization and interpretation.

3 RESULTS AND DISCUSSION

The research has indicated that the issue of teaching reading to children with ASD is fairly widespread and challenging. This is attributed to the fact that children with ASD tend to quickly tire, get distracted, and exhibit a specific need for maintaining consistency in their environment, following established routines, schedules, images, and drawings, among other aspects. Hence, the utilization of visual information or "visual support," characterized by the clear presentation of information, significantly contributes to the better assimilation of educational materials by children with ASD.

The process of teaching global reading to children with Autism Spectrum Disorder follows a certain sequence and stages, taking into consideration the degree of expression of autistic disharmony. In our study, the staged approach consisted of the following components (Kolomoiets and Kassim, 2018):

1) establishing a "safe" interaction environment for the child;
2) teaching the child to match labels with pictures (if the child correctly pronounced the name, we offered to "animate" the picture using augmented reality technology);
3) associating verbs (e.g., the cat begins to move – it runs) with the subject items (pictograms to pictures);
4) working with individual booklets: forming sentences and reading aloud;
5) employing augmentative and alternative communication (AAC) using PECS (picture exchange communication system) cards – children reinforce the visual image of the word;
6) utilizing mnemonic tables in augmented reality for reading.

It's important to note that adhering to such an algorithm in the teaching process will contribute to the development of language skills in children.

The use of augmented reality (AR) tools in working with children presents specific features (Syrovatskyi et al., 2018):

1) formation of a new understanding of educational material based on cognitive and emotional experiences – ensuring emotional and cognitive engagement;
2) the potential to enhance the realism of the studied material through "living" images;
3) introducing new ways of presenting real learning objects.

In the modern educational environment, three main categories of augmented reality educational systems are identified: "visualization of 3D images for visualizing educational material; recognition and labeling of real objects oriented in space; interaction between a computer-generated virtual object (or smartphone) and a person in real-time mode" (Tsyrulnyk, 2019).

Among the key characteristics of augmented reality are the following (Syrovatskyi et al., 2018):

- combining real-world objects with computer-generated data;
- enhancing real-world objects with computer-generated sensory data (sound, video, graphics, position);
- creating a semantic context that merges physical and digital spaces, where objects of association are located in the real world;
- simplified display of virtual objects compared to virtual reality;
- controlled interaction with the learning object for exploring its features.

It's worth noting that the contemporary social and educational environment, both general and specialized, is infused with tools that facilitate the integration and application of augmented reality. Given the comprehensive development of this approach in the modern world, we have decided to test the effectiveness of using AR in working with children with ASD.

Based on the aforementioned stages in teaching children with ASD global reading and incorporating augmented reality elements into this process, we conducted practical research on the outlined issue. Our study was based at the "Kryvyi Rih Special Multiprofile Educational and Rehabilitation Center No. 1" under the Dnipropetrovsk Regional Council.

Our research was divided into four main stages. The first, the problem- search stage, involved defining the goal, developing an empirical research program, justifying the relevance of the proposed technology in special education. We selected methods (experiment, descriptive and comparative methods of analysis, generalization, logical method), as well as augmented reality tools. An experimental methodology and its targeted model were created.

The empirical research program on the effectiveness of augmented reality technology in teaching global reading to children with ASD is presented in table 1.

The second – **diagnostic** – stage was aimed at processing documents (medical reports, conclusions of psychoneurological institutions, psychological and

Table 1: Program of empirical study on the effectiveness of augmented reality technology in teaching global reading to children with ASD.

Experiment program (stages)	The main tasks achieved	Methods of research and work
Problem-search stage	The goal was defined, the expediency of using augmented reality technology in special education was substantiated, methods and tools of work were chosen, an experimental methodology and its target model were created	Experiment, descriptive and comparative methods of analysis, generalization, logical method
Diagnostic stage	The use of a complex of psychodiagnostic methods before the start of experimental work	CARS scale, PEP-R developmental scale profile. Speech examination
Empirical-synthesizing stage	1. Development of visual perception, formation of the ability to analyze, distinguish and generalize, orient oneself in space	Methods and techniques are aimed at forming simultaneous syntheses of a clear internal schematization of experience
	2. Work aimed at understanding words and correlating them with images	Synthesis of individual elements into consecutive series (Tarasun, 2022)
	3. Performance of visual movements, vestibular projections, formation of optical and kinesthetic sensations, development of sensorimotor abilities and successive structures at the cognitive level	Visual systems: Picture Exchange Communication Symbols (PECS), Picture Communication Symbols (PCS), platform Blippar, methods of teaching global reading
	4. Development of expressive, narrative, fluent reading	Pictograms of I. Koroliova, L. Nuriieva
	5. Vocabulary formation: antonyms, paronyms, synonyms	The child selects a card with the appropriate image and correlates it with the word on the card
Interpretive-summary stage	The use of a complex of psychodiagnostic techniques after the experimental work. Statistical processing of empirical data. Description and interpretation of the results before and after the implementation of the experimental teaching method. Formulation of research conclusions and results. Outlining prospects for further research in this context	Method of mathematical data processing. Methods of empirical data interpretation. PEP-R Developmental Scale Profile

pedagogical characteristics, psycho-corrective programs), and application of CARS scales for evaluating children's autism manifestations, the profile of the PEP-R development scale before the start of training.

The parameters of the diagnostic toolkit included the specificity of the scales, reliability, validity, standardization of methods for displaying personal characteristics. The Psychoeducational profile revised (PEP-R) is a set of skills and behaviors that serve as a diagnostic toolkit for determining a child's characteristic ways of learning. The test is designed to assess the development of children with autism and children with developmental disorders, it is designed for preschool age (from 6 months to 7 years). The materials for the test include the study of imitation skills, perception, fine and gross motor skills, visual-motor coordination, cognitive activity, communication and active speech.

Note that 21 children aged 3 to 7 years old took part in the diagnostics. The initial distribution of children according to gender and age characteristics is presented in table 2.

Table 2: Distribution of respondents according to gender and age characteristics.

Gender	Age		
	3-4 years	5-7 years	Total
Male	9	5	**14**
Female	4	3	**7**
Total	**13**	**8**	**21**

The PEP-R scale elements are divided into seven areas of development: imitation; perception; fine motor skills; gross motor skills; eye-motor coordination; cognitive activity; communication, active speech. Within our study, we were most interested in the results on the last scale. The results of the initial check are presented in figure 1.

Thus, the initial data according to the PEP-R developmental scale indicate age-inappropriate speech in a significant number of preschool children with ASD – 76.19%. In addition, 23.81% of respondents have no speech at all. The obtained data indicate the need for the development and correction of speech in children with ASD.

The next method we chose was the "Childhood Autism Rating Scale" (CARS), which was used to diagnose a child's non-standard behavior: assessment of the size of the problem (conformance to the norms of behavior – "appropriate", "moderately appropriate", "largely non-compliant". The scale consists of 15 items: "Relationships with people", "Body control", "Imitation", "Emotional reaction", "Using objects", "Adaptation to changes", "Visual reaction", "Aural reaction", "Taste, smell, reaction to touch", "Shyness or nervousness", "Verbal communication", "Non-verbal communication", "Activity level", "Level and degree of intellectual development", "General impression". It allows to diagnose children with autism, distinguish them from children with developmental disorders, but without autism syndrome.

Using the specified diagnostic methods, we received information about a group of tools that improve the ability of children with ASD to understand and interpret information. Based on the results of psychological diagnostics of children (who participated in the experimental work) using the specified methods, the following results were obtained: the age indicators of children's development relative to the normal population in 21 children with ASD (80%) decreased by an average of 1-3 years. The study of the level of verbal and non-verbal communication is shown in figure 2.

Having analyzed the obtained data, note that 13% of children have severe deviations in verbal communication. They do not use meaningful language. Instead, they utter squeaks, strange sounds, close to human speech. Moderate deviations in verbal communication were observed in 46%. Such children generally lack language. When present, verbal communication is mixed with meaningful or strange language, slight echolalia. A peculiarity in meaningful language is the inclusion of unnecessary questions and interest in certain topics. 41% of children show minor deviations in verbal communication. Language in children is generally formed with a delay. Most parts of the speech are understood, while there is a slight echolalia, incorrect agreement of nouns with numerals, use of cases and pronouns. Sometimes some strange words are used.

According to the results of the study of the level of non-verbal communication, the following results were obtained: 6% have significant violations in non-verbal communication – the child only uses strange gestures that have no obvious meaning and does not understand the meaning of other people's gestures and facial expressions. A significant group of children, 60%, showed moderate deviations in the use of non-verbal communication. Children in general can express their needs and desires non-verbally, but cannot understand the non-verbal appeal of others. Adults are often used as a tool to achieve the desired goal. 34% of children have minor deviations in non-verbal communication. Children demonstrate immature use of non-verbal communication; can only show vaguely or reach for what the child wants, in a situation where a child of the same age normally shows and explains with gestures what exactly he wants.

None of the children knew global reading. It should be noted that 32% of respondents demonstrated knowledge of the letters of the Ukrainian and English languages. Children recognized them in pictures, cubes, laid them out in a certain (at their own discretion) sequence.

At the third – **empirical-synthesizing** – stage, there was an experimental verification of the effectiveness of the developed methodology of using augmented reality for teaching global reading to children with ASD. The technologies of augmented reality that we used in our research are described in our previous publication (Syrovatskyi et al., 2018). The same respondents took part at this stage as at the previous one.

Teaching global reading to children with Autism Spectrum Disorder (ASD) was carried out individually, and augmented reality was created using the Blippar platform. For the initial stage of global reading instruction, the child was presented with the task of recognizing an object, matching it with an image on the picture, and naming it. Afterward, a printed word denoting the object appeared on the screen, which the child had to read and memorize (Task 1). In the subsequent stage, after mastering the reading of nouns, verbs, and adjectives, children were presented with a set of tasks involving reading simple phrases (Task 2) and simple sentences. Examples of tasks for teaching global reading to children with ASD using augmented reality are shown in figures 3 and 4.

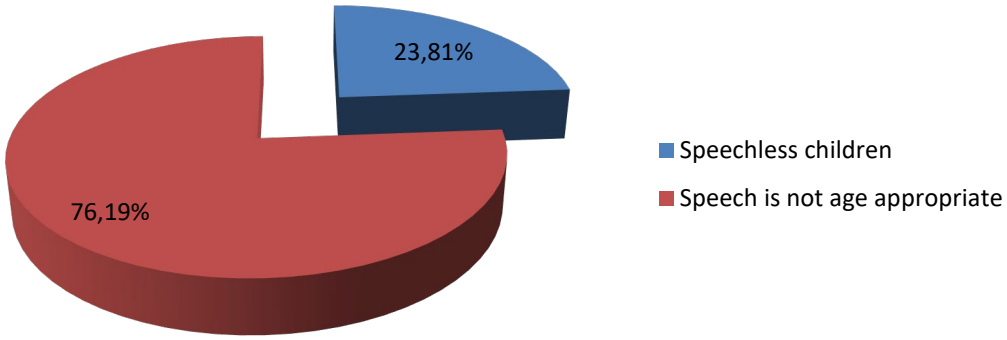


Figure 1: Results of the study of children with ASD according to PEP-R scale.

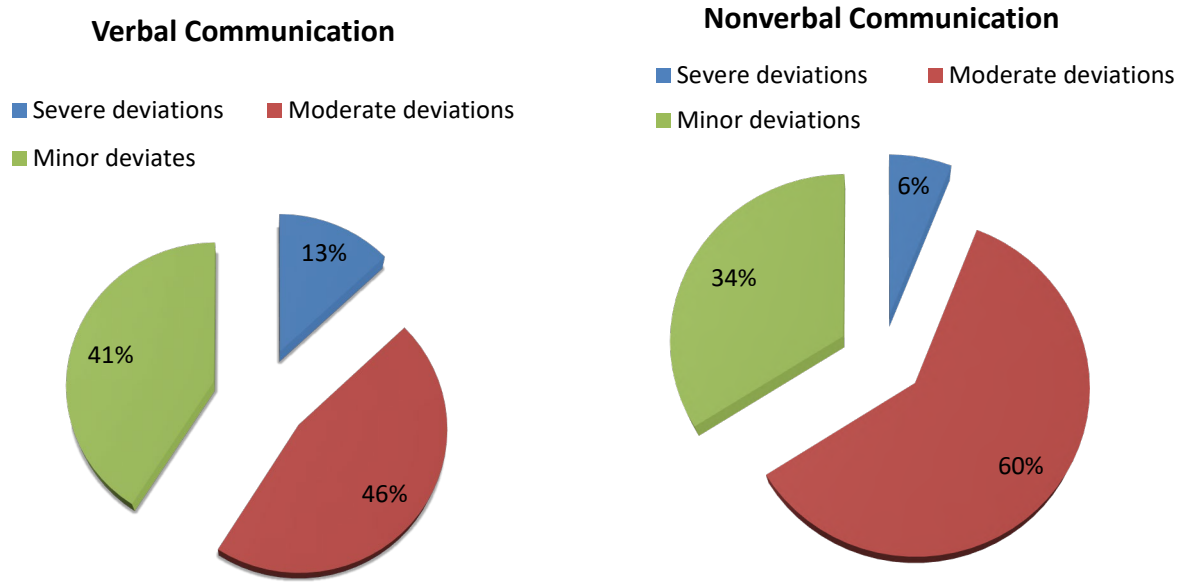


Figure 2: Results of the examination of children with ASD using the CARS method.

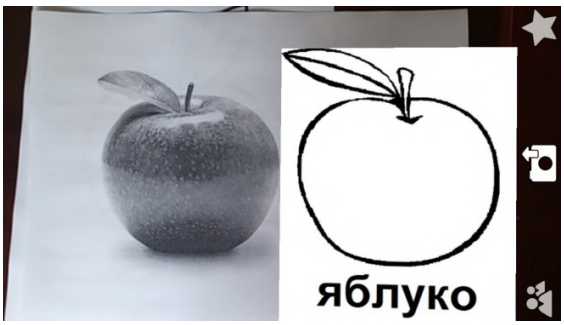


Figure 3: Screen capture for Task 1.

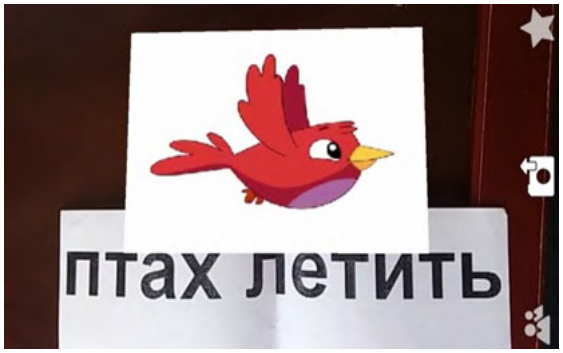


Figure 4: Screen capture for Task 2.

Note that a particularly significant result was obtained through the use of augmented reality technology. It should be noted that this technology "combines real and virtual elements with the real world: virtual objects are added to the user's real environment that change as a result of his actions" (Syrovatskyi et al., 2018). Regarding the application of augmented reality in teaching global reading to children with ASD, we note that the picture began to move, acquire color, volume in the case when the child correctly pronounced the name selected for the picture. It was this tool that stimulated children to work, and formed in them a persistent interest in ver-

Table 3: Results of the annual diagnostics of active speech of children in the research group while implementing corrective measures, %.

Categories of children	Years				Growth (decrease) rate, %		
	2019	2020	2021	2022	2019-2020	2020-2021	2021-2022
Speechless children	23.81%	20.64%	11.12%	9.52%	-13.31	-46.12	-14.39
Children whose speech is not age appropriate, including:	76.19%	79.36%	88.88%	90.48%	4.16	12.00	1.80
Moderately appropriate	17.8%	25.5%	38.11%	56.03	43.26	49.45	47.02
Largely non-compliant	58.39%	53.86%	50.77%	34.45%	-7.76	-5.74	-32.14

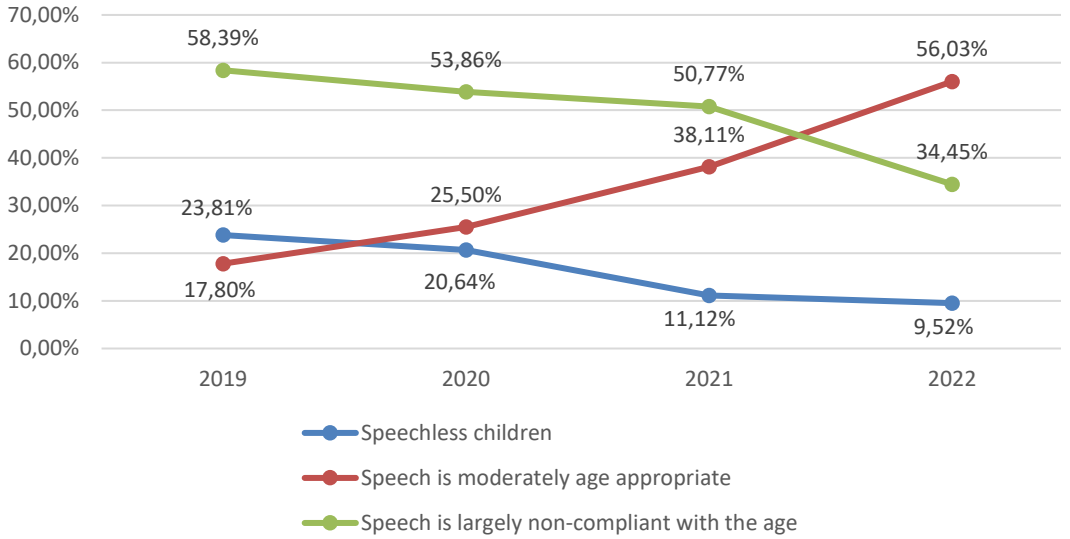


Figure 5: Dynamics of changes in the structure of children with ASD PEP-R according to the active speech criterion.

bal interaction with technology and the teacher. We note that formation of a stable interest in working with digital technology can positively affect the further development, integration and future independent life of children with ASD. After all, it will provide opportunities for obtaining a profession and financial independence.

The fourth – **interpretative-summary** – stage, included diagnostics, analysis and interpretation of the obtained data, summarization of the research results and drawing conclusions.

Thus, the last stage of the work involved re-diagnostics using the methods defined during the second stage of the study. The corresponding dynamics of changes in the state of active speech of children with ASD due to the implementation of appropriate corrective and developmental measures, which lasted 4 years (during 2019-2022) are shown in the table 3.

From the data presented in table 3, as well as from figure 4, it can be seen that at the end of the analyzed period, the situation with the number of speech-impaired children improved significantly (their share decreased from 23.81% in 2019 to 9.52% in 2022) (figure 5).

The obtained data are a significant indicator of the effectiveness of the presented methodology. Therefore, it can be argued that the proposed methodology of teaching global reading to children with ASD is a modern technology of visualizing educational information. In our opinion, its use increases the motivation to study, the level of information assimilation due to the diversity and interactivity of its visual presentation, and contributes to the formation of oral speech of a certain category of children.

4 CONCLUSIONS

Thus, the results of the conducted research convincingly demonstrate the effectiveness of the proposed methodology for teaching global reading to children with Autism Spectrum Disorder (ASD) during the use of Alternative and Augmentative Communication (AAC) systems with the utilization of Augmented Reality technology. The suggested algorithm for the formation of the technology for teaching children with ASD global reading comprises the following stages: 1) creating a 'safe' interaction en-

vironment for the child; 2) teaching the child to match captions to pictures (if the child pronounced the word correctly, we offered to 'animate' the picture using Augmented Reality technology); 3) associating verbs with object names (pictograms to pictures); 4) working with individual books: forming sentences and reading aloud; 5) utilizing the Picture Exchange Communication System (PECS) – cards with labels – to reinforce the visual representation of words; 6) employing an Augmented Reality mnemonic table for reading. The developed program for enhancing the effectiveness of teaching global reading to children with ASD using Augmented Reality technology, which includes problem-search, diagnostic, empirically-synthetic, and interpretative-summarizing stages, has proven its effectiveness in practical application. The diagnostic results of children with ASD before and after the experiment confirmed the effectiveness of the proposed methodology for teaching global reading to children with ASD. In particular, there was a significant improvement in the number of non-verbal children (their proportion decreased from 23.81% in 2019 to 9.52% in 2022). In our opinion, this technology plays a crucial role in positively impacting the practice of teaching global reading to children with ASD.

REFERENCES

Bonora, G., Dalai, G., De Rosa, D., Panunzi, M., Perondi, L., and Rubertelli, C. (2019). PASS: Picture Augmentative Synsemic System. Un nuevo sistema para las prácticas habilitativas en la CA (comunicación aumentativa): marco teórico. *INMATERIAL. Diseño, Arte y Sociedad*, 4(08):33–78. https://doi.org/10.46516/inmaterial.v4.61.

Khvorova, H. M. (2011). *A child with autism: comprehensive psychological and pedagogical assistance*. Lesya, Kiev.

Kolomoiets, T. H. and Kassim, D. A. (2018). Using the Augmented Reality to Teach of Global Reading of Preschoolers with Autism Spectrum Disorders. *CEUR Workshop Proceedings*, 2257:237–246. https://ceur-ws.org/Vol-2257/paper24.pdf.

Light, J. and McNaughton, D. (2012). The Changing Face of Augmentative and Alternative Communication: Past, Present, and Future Challenges. *Augmentative and Alternative Communication*, 28(4):197–204. https://doi.org/10.3109/07434618.2012.737024.

Ostrovska, K., Ostrovskii, I., and Korniat, V. (2018). Social and professional skills of adolescents with autism spectrum disorders. *Special Education*, 1(38):61–103. https://doi.org/10.21277/se.v1i38.358.

Romanchuk, O. (2016). *Autism spectrum disorders*. Svichado, Lviv.

Shevtsov, A. G. (2009). *Educational bases of rehabilitation*. Lesya, Kiev.

Shulzhenko, D. I. (2009). *Fundamentals of psychological correction of autistic disorders in children*. Kiev.

Sinyov, V. M. (2007). *Mental retardation as a pedagogical problem*. Kiev.

Skrypnyk, T. and Lozova, O. (2020). Formation of Dialogic Interactions in Children with Autism Spectrum Disorders. *Psycholinguistics*, 27(1):237–261. https://doi.org/10.31470/2309-1797-2020-27-1-237-261.

Stone, F. (2004). *Autism – The Eighth Colour of the Rainbow: Learn to Speak Autistic*. Jessica Kingsley Publishers, London.

Syrovatskyi, O. V., Semerikov, S. O., Modlo, Y. O., Yechkalo, Y. V., and Zelinska, S. O. (2018). Augmented reality software design for educational purposes. *CEUR Workshop Proceedings*, 2292:193–225. http://ceur-ws.org/Vol-2292/paper20.pdf.

Tarasun, V. (2022). Neuropsycholinguistic Foundations Diagnostics of Features of Development of Preconditions Teaching Writing to Children with Autism. *Psycholinguistics*, 32(1):163–188. https://doi.org/10.31470/2309-1797-2022-32-1-163-188.

Tsyrulnyk, S. (2019). The use of augmented reality technology in the process of training specialists in electronics. *Electronic Scientific Professional Journal "OPEN EDUCATIONAL E-ENVIRONMENT OF MODERN UNIVERSITY"*, page 355–362. https://doi.org/10.28925/2414-0325.2019s32.

Wetherby, A. M., Prizant, B. M., and Hutchinson, T. A. (1998). Communicative, Social/Affective, and Symbolic Profiles of Young Children With Autism and Pervasive Developmental Disorders. *American Journal of Speech-Language Pathology*, 7(2):79–91. https://doi.org/10.1044/1058-0360.0702.79.

Wisevoter (2023). Autism Rates by Country. https://wisevoter.com/country-rankings/autism-rates-by-country/.

A Comprehensive Framework for Assessing Scientific Research Effectiveness Among Academic and Research Staff

Svitlana M. Ivanova[1][a], Oleg M. Spirin[1][b], Oleksandr M. Shymon[1][c], Tetiana A. Vakaliuk[2,1,3,4][d], Iryna S. Mintii[1,3,5,2,4][e] and Serhiy O. Semerikov[3,1,2,6,4][f]

[1]*Institute for Digitalisation of Education of the NAES of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine*

[2]*Zhytomyr Polytechnic State University, 103 Chudnivsyka Str., Zhytomyr, 10005, Ukraine*

[3]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[4]*Academy of Cognitive and Natural Sciences, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*

[5]*Lviv Polytechnic National University, 12 Stepana Bandery Str., Lviv, 79000, Ukraine*

[6]*Kryvyi Rih National University, 11 Vitalii Matusevych Str., Kryvyi Rih, 50027, Ukraine*

{*iv69svetlana, oleg.spirin, o.m.shymon*}*@gmail.com*, {*tetianavakaliuk, mintii, semerikov*}*@acnsci.org*

Keywords: Research, Assessment Criteria, Academic Staff, Research Staff, Higher Education Institutions, Effectiveness, Indicators, Criteria.

Abstract: This paper addresses the crucial task of devising comprehensive criteria and indicators for evaluating the effectiveness of pedagogical research conducted by academic and research staff in higher education institutions (HEIs). Four major assessment criteria are identified: publication and dissemination, utilization, impact on the academic community, and representation-scientific. Each criterion is further broken down into specific indicators, including involvement in project competitions, scientific publications in reputable journals and conference proceedings, indices and citations in various databases, altmetric indicators such as electronic repositories and social media engagement, expert involvement in academic and research activities, and attainment of academic titles and honors. The classification of these criteria provides a systematic framework for assessing the multifaceted aspects of pedagogical research effectiveness. Further research prospects involve assigning weight coefficients to these criteria and developing a methodology that integrates digital technologies to streamline the assessment process.

1 INTRODUCTION

The Higher Education Development Strategy in Ukraine for 2021-2031 identifies "low levels of motivation, including compensation for the work of teachers and university staff" as one of the weaknesses of higher education (Strategy, 2020). The need for developing a "national system for rating the activities of HEIs" is emphasized. One of the most common approaches underlying the assessment of the performance of academic and research staff (ARS) is based on utilizing indicators obtained from bibliographic databases such as Scopus, Web of Science, and Google Scholar. This approach is driven by the clear interdependence between data from these databases, institutional positions in domestic and international rankings (Times Higher Education World University Rankings, QS World University Rankings, Transparent Ranking, Ranking Web, Webometrics, Top-200 Ukraine based on Scopus bibliometric indicators, Consolidated Ranking of Ukrainian HEIs), as well as institutions' funding.

Morze et al. (2022) have developed a structural-functional model of a ranking system to analyze the research activities of university lecturers, considering research and digital competencies. This model is built on key indicators for research effectiveness, including citation indicators from three major bibliographic databases: Scopus, Web of Science, and Google Scholar.

However, academic and research staff engage in a variety of activities beyond research publica-

[a] https://orcid.org/0000-0002-3613-9202
[b] https://orcid.org/0000-0002-9594-6602
[c] https://orcid.org/0000-0001-7009-2682
[d] https://orcid.org/0000-0001-6825-4697
[e] https://orcid.org/0000-0003-3586-4311
[f] https://orcid.org/0000-0003-0789-0272

Ivanova, S., Spirin, O., Shymon, O., Vakaliuk, T., Mintii, I. and Semerikov, S.
A Comprehensive Framework for Assessing Scientific Research Effectiveness Among Academic and Research Staff.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 156-162
ISBN: 978-989-758-579-1

tions. A more comprehensive approach to evaluating ARS performance has been proposed at Kryvyi Rih State Pedagogical University. The ARS ranking is constructed by considering data such as: articles indexed in Scopus, Web of Science, foreign journals, and professional journals indexed by Index Copernicus; domestic/foreign monographs (single-authored/collaborative); research projects (domestic/foreign funded by the state budget of Ukraine or grants from foreign entities); winners of the All-Ukrainian competition of student research papers/All-Ukrainian Olympiads; international competitions and Olympiads (participation/winners); mobility (EU international programs, exchanges, advanced training courses, internships); participation in conferences and events abroad (with presentations); research and cultural projects without funding (in Ukraine/abroad); patents, technology implementation, authorship certificates; state budget-funded research topics; PhD thesis defenses; academic title attainment; training higher-qualified personnel (PhD defenses); international contacts, cooperation, signed cooperation agreements; dual degrees; membership in editorial boards of journals indexed by Scopus or Web of Science; professional publications indexed in bibliographic databases; academic schools; research centers, laboratories, etc. (Order, 2021; Vakaliuk et al., 2022).

2 LITERATURE REVIEW

Let's begin by examining studies dedicated to the assessment of the performance of ARS based on publication indicators. For instance, Moral-Muñoz et al. (2020) emphasize the significance of scientometrics as a crucial tool for evaluating and analyzing the outcomes not only of individual researchers but also of collaborations between institutions. They point out its role in understanding the influence of state funding on research outcomes. Among the frequently used criteria, the quantity of papers and the h-index (derived from various bibliographic databases like Scopus, Web of Science, Google Scholar) remain prominent. Masic and Begic (2016) explored quantitative indices (indicators) of research success and identified four indices: the number of papers, journal impact factor, authorship order and quantity, and citation count. Bykov et al. (2021) and Vakaliuk et al. (2021b) analyze the correlation between institutional rankings and metrics from bibliographic databases as well as the development of individual ARS rankings using such data.

In recent times, as a supplement and/or alternative to bibliometric data, alternative metrics, or "altmetrics," have gained attention for evaluating ARS performance. Altmetrics are based on measuring the impact and popularity of research and researchers using data from various social, professional, and online platforms. Altmetrics serve as a complement or alternative to traditional bibliometric metrics such as citations in scholarly journals.

Altmetric indicators encompass a wide range of data that can be used to gauge the impact of research:

1. *Views*: the number of views on scientific articles, presentations, or other scientific materials. This indicator reflects general interest in the research and its accessibility.
2. *Discussions*: the quantity of comments, discussions, or debates related to a scientific article or other research materials. This indicator represents the level of activity and interaction within the scientific community concerning the research.
3. *Saves*: the number of times research has been saved or added to users' "favorites" on a given platform. This indicator indicates interest in saving and later using the research.
4. *Citations*: the number of references to the research in scholarly articles, books, or other academic sources. This indicator is considered a fundamental measure of scientific impact and citation.
5. *Recommendations*: the number of recommendations (likes) that research has received on social media or other platforms. This reflects the satisfaction or endorsement of the research by the community.

Altmetric indicators can be obtained from various sources, including academic social networks such as ResearchGate and Twitter, as well as specialized platforms that collect data on research articles and their impact, such as Altmetrics Explorer. For instance, Singh et al. (2022) examined altmetric data from the ResearchGate network, a popular professional network for researchers. Similar to Google Scholar, ResearchGate indexing involves an automated scanning algorithm that provides bibliographic data, citations, and other information about research articles from various sources. Wiechetek and Pastuszak (2022) also analyzed the use of ResearchGate metrics and compared them to metrics from the Academic Ranking of World Universities. Although not directly addressing the participation of ARS in editorial boards, these studies highlight the importance of leveraging social networks for promoting research achievements and enhancing visibility within the academic community. Cao et al. (2022) suggested using Twitter as a source

of altmetric data. Shirazi and Valinejadi (2021) compared altmetric indicators from the Altmetrics Explorer system with citation quality metrics from Clarivate Analytics, Scopus, and Medline. Based on their findings, they recommended that journal editors ensure their presence on social networks.

Integrating altmetric indicators can help researchers, academic journals, and institutions gain a more comprehensive understanding of the impact of their research, demonstrating their visibility and popularity within the scientific community. Given the widespread availability and use of social media, altmetrics increasingly serve as a vital tool for measuring research impact and communication.

Other indicators mentioned in (Order, 2021) have not been as extensively investigated. For instance, assessing ARS performance based on project activities and the preparation of winners of student research paper competitions and All-Ukrainian Olympiads, which are also considered in constructing domestic rankings (Top 200 Ukraine, Consolidated Ranking of Ukrainian HEIs), is discussed in (Vakaliuk et al., 2022).

Currently, few works directly investigate the participation of ARS in editorial boards and roles as reviewers, experts, or other functional positions in scientific journals. However, some studies touch on this topic and provide partial recommendations. Salinas et al. (2020) tackled reviewer selection issues and introduced the ReviewerNet system, an online interactive visualization tool designed to enhance the reviewer selection process in the academic sphere. Although not directly focused on ARS involvement in editorial boards, it could serve as a valuable instrument for improving reviewer selection and evaluation processes. Yu et al. (2021) examined the link between organizational support and job burnout among academic journal editors, providing insights into factors impacting effectiveness and satisfaction among editors in their roles. Additionally, Xu et al. (2021) identified challenges faced by academic journal editors and their underlying reasons. This information can be valuable for understanding the context in which ARS engage in editorial boards and provide a contextual foundation for future studies on this topic.

Despite some existing research highlighting approaches to assessing ARS performance, criteria and indicators for such evaluations remain underdeveloped.

3 RESULTS

The analysis of the scientific activities of ARS at higher education institutions and research institutions allowed us to identify the relevant criteria and indicators for evaluating the performance of pedagogical research. Building upon previous research experience, each criterion includes from 3 to 7 indicators (Spirin and Vakaliuk, 2017):

- *Project-Competition Criterion*: preparation for project competitions; participation in projects; preparation of students for participation in student research competitions;
- *Scientific-Publication Criterion*: publications in journals indexed in bibliographic databases such as Web of Science, Scopus; publications in conference proceedings indexed in Web of Science, Scopus; publications in specialized scientific journals in Ukraine; publications in international periodicals and conference proceedings; publications in Ukrainian scientific journals not included in the list of specialized publications and publications in domestic conference materials; publication of monographs in Ukraine / international publications; publication of educational manuals or textbooks; supervision of students publishing research results in various publications;
- *Scientometric Criterion*: indexing in Scopus / Web of Science / Google Scholar; citations in Scopus / Web of Science / Google Scholar;
- *Altmetric Criterion*: electronic libraries, repositories; electronic portfolio; number of downloads; number of views; social media dissemination;
- *Expert Criterion*: participation as a reviewer / expert / opponent in PhD thesis; participation in various commissions, expert councils under the Ministry of Education and Science (including project selection), National Academy of Pedagogical Sciences of Ukraine (NAPN), The National Research Foundation of Ukraine (NRFU); editor-in-chief / deputy editor-in-chief / editorial board member of a professional journal; involvement in conference organization;
- *Representative-Scientific Criterion*: PhD thesis defense; academic title attainment; honorary title attainment; awards / distinctions / prizes / scholarships; supervision of a graduate student who defended a PhD thesis; participation in international internships; foreign language proficiency at the B2 level.

We will describe each criterion and explore all the indicators in more detail.

Project-Competition Criterion involves evaluating the performance of pedagogical research within participation in contests and projects, including:

1. The "Preparation for project competitions" indicator assesses the researcher (whether ARS or research staff) based on the number of projects prepared for participation in competitions. The assessment period can range from 1 to 5 years. This is related to the fact that clause 38 of the Licensing Conditions for Educational Activities requires consideration of different types of activities over 5 years, while the contract between the institution and the employee may be signed for only 1 year or 2 years, and so on. This clarification applies to all indicators and criteria described in this paper.
2. The "Participation in projects" indicator accounts for the researcher's participation in projects as a simple performer, principal performer, or project leader. If the researcher participates in multiple projects simultaneously, this is also considered. This indicator can be taken into account if the researcher participates not only in ministerial projects but also in international ones.
3. The "Preparation of students for participation in student research competitions" indicator stipulates that ARS prepare students to participate in nationwide and international competitions of various levels, including private competitions (e.g., Zavtra.Ua).

Scientific-Publication Criterion encompasses the evaluation of performance within the realm of publication activity, which includes the following indicators:

1. Publications in journals indexed in bibliographic databases such as Web of Science, Scopus – this indicator entails having a certain number of publications in the specified journals.
2. Publications in conference proceedings indexed in bibliographic databases such as Web of Science, Scopus – this indicator differs from the previous one in that it refers to articles published in books or conference journals (Proceeding Journals), which are also indexed in the mentioned databases. Such articles in the Scopus database are referred to as proceeding papers, although they don't significantly differ from full-fledged articles.
3. Publications in specialized scientific journals in Ukraine – this indicator entails having articles published in journals listed as specialized publications approved by the Ministry of Education and Science of Ukraine.
4. Publications in international periodicals and conference proceedings – although this indicator may not hold considerable value, in some HEIs, it is a mandatory clause in contracts. This indicator includes publications not covered by the first two indicators. While this point may seem less valuable, the number of publications in the international community also contributes to a researcher's status, even if not in bibliographic databases like Scopus or Web of Science, at least in Google Scholar. Not all educational institutions and research establishments have subscribed access to the mentioned databases to explore the research output of a specific researcher, thus making these indicators relevant.
5. Publications in Ukrainian scientific journals not included in the list of specialized publications and publications in domestic conference materials – this indicator also combines two aspects, encompassing publications in sources not covered by the previous indicators.
6. Publication of monographs in Ukraine / international publications – publishing a monograph serves as a culmination of work on a specific topic, hence its publication is one of the indicators.
7. Publication of educational manuals or textbooks – this indicator is particularly important for ARS, as the presence of such publications is significant both for teaching activities and for meeting licensing requirements.
8. Supervision of students publishing research results in various publications – this indicator is designed for ARS who guide student research work, resulting in publications by students in various sources.

Scientometric Criterion involves evaluating the performance of ARS and researchers in institutions of higher education and research establishments based on indexing and citation in various scientometric databases, including:

1. "Indexing in Scopus / Web of Science / Google Scholar" indicators involves considering the researcher's h-index according to the corresponding bibliographic database.
2. "Citations in Scopus / Web of Science / Google Scholar" – these indicators entails determining the total number of citations in the corresponding bibliographic database.

Altmetric Criterion involves evaluating the performance of HEI's research and academic staff (RAS) based on other equally important indicators:

1. "Electronic Libraries, Repositories" indicator entails assessing the completeness of electronic libraries of research establishments and HEIs with all published works.
2. "Electronic Portfolio" indicator entails having a well-maintained personal electronic portfolio (Vakaliuk et al., 2021a).
3. "Number of Downloads" indicator takes into account the number of downloads of research works from repositories and electronic libraries. This indicator should be considered cumulatively for all of the author's publications simultaneously.
4. "Number of Views" indicator similarly to the previous one involves considering the total number of views of all of the author's publications in a repository or electronic library.
5. "Social Media Outreach" indicator involves having a presence on social media platforms and disseminating one's research activity through them. This indicator is evaluated for specific social media platforms like Facebook, LinkedIn, etc.

Expert Criterion is no less important than the previous ones, as it considers the researcher's involvement in various expert roles, including:

1. Involvement as a reviewer / expert / opponent for PhD thesis – this indicator entails the participation of RAS or researchers in these roles during the defense a PhD thesis.
2. Participation in various committees, expert councils under the Ministry of Education (including project selection) – this indicator involves participating in different expert councils or Accreditation Commissions:
   - Expert Council for Dissertation Examination of the Ministry of Education and Science;
   - Branch Expert Council as an expert of the National Agency for Quality Assurance in Higher Education;
   - Expert commissions of the Ministry of Education and Science or the National Agency for Quality Assurance in Higher Education;
   - Interbranch Expert Council on Higher Education of the Accreditation Commission;
   - Accreditation Commission;
   - Scientific and Methodological Council;
   - Scientific and Methodological Commissions (subcommissions) on higher or specialized postgraduate education of the Ministry of Education and Science;
   - Scientific or scientific-methodical or expert councils of state authorities and local self-government bodies;
   - State Service for Quality of Education for conducting planned (unscheduled) measures of state supervision (control), etc.
3. Editor-in-Chief / Deputy Editor-in-Chief / Editorial Board Member of a specialized journal – this indicator involves actual participation in one of these roles for specialized journals in Ukraine;
4. Participation in conference organization – this indicator involves participating in the organization of conferences of various levels as a program committee member or reviewer, which enhances the researcher's professional level.

Representational-Scientific Criterion is a criterion that involves assessing the performance of HEI researchers and scientific personnel based on specific achievements:

1. "PhD Thesis Defense" involves the presence of a defended PhD thesis (for obtaining a doctoral or candidate of science degree) within the reporting period.
2. "Attainment of Academic Title" involves the acquisition of a diploma confirming an academic title (again, within the period specified by the institution or educational establishment).
3. "Attainment of Honorary Title" involves the conferment of an honorary title on a researcher as provided by the Ministry of Education and Science of Ukraine.
4. "Receipt of Awards / Honors / Prizes / Scholarships" entails researchers receiving various awards, prizes, etc., as stipulated by the Ministry of Education and Science of Ukraine, the Cabinet of Ministers of Ukraine, the Verkhovna Rada of Ukraine, etc.
5. "Supervision of a Defended PhD thesis" pertains to the presence of a defended PhD thesis under the guidance of the researcher. Additionally, this indicator can also encompass the supervision of a doctoral candidate's defense under the guidance of this personnel.
6. "Participation in International Internships" involves possessing a certificate of participation in international scientific or scientific-pedagogical internships once every 5 years.
7. "Proficiency in a Foreign Language at B2 Level" involves passing an examination to demonstrate proficiency in a foreign language (such as English, Polish, etc.) and obtaining the corresponding certificate.

All the identified criteria can be tentatively classified into criteria related to **publication and dissemi-**

nation (altmetric, scientific publication-related), **utilization** (scientometric, project competition-related), and **impact on the academic community** (expert-related, representational-scientific).

4 CONCLUSIONS AND PROSPECTS

The article substantiates the necessity of identifying criteria and indicators for assessing the effectiveness of pedagogical research conducted by academic and research staff.

The following criteria and corresponding indicators have been identified and described: project competition-related (preparation for project competitions; participation in projects; preparing students for participating in student research competitions); scientific publication-related (publications in journals indexed in Web of Science, Scopus; publications in conference proceedings indexed in Web of Science, Scopus; publications in domestic scientific journals; publications in international periodicals and conference materials; publications in domestic non-listed journals and conference materials; publication of monographs in domestic/international publications; publication of educational guides or textbooks; supervision of students publishing research outcomes in various publications); scientometric (indexing in Scopus; indexing in Web of Science; indexing in Google Scholar; citations in Scopus; citations in Web of Science; citations in Google Scholar); altmetric (electronic libraries, repositories; electronic portfolio; download count; view count; social media dissemination); expert-related (participation as a thesis reviewer/expert/opponent; involvement in different committees, expert councils under the Ministry of Education (including project selection); chief editor/deputy chief editor/editorial board member of a professional journal; participation in conference organization); representational-scientific (dissertation defense; attainment of academic titles; attainment of honorary titles; receipt of awards/honors/prizes/scholarships; supervision of a defending doctoral candidate; participation in international internships; proficiency in a foreign language at B2 level).

The identified criteria can be tentatively divided into those pertaining to publication and dissemination, utilization, and impact on the academic community.

The prospects for further research involve determining weight coefficients for the established criteria and indicators within HEIs and research institution personnel. Additionally, a methodology for employing information and digital technologies to assess the effectiveness of pedagogical research could be developed.

REFERENCES

Bykov, V. Y., Spirin, O. M., Ivanova, S. M., Vakaliuk, T. A., Mintii, I. S., and Kilchenko, A. V. (2021). Scientometric indicators for evaluating the effectiveness of pedagogical research of scientific institutions and educational institutions. *Information Technologies and Learning Tools*, 86(6):289–312.

Cao, R., Geng, Y., Xu, X., and Wang, X. (2022). How does duplicate tweeting boost social media exposure to scholarly articles? *Journal of Informetrics*, 16(1).

Masic, I. and Begic, E. (2016). Evaluation of scientific journal validity, it's articles and their authors. *Studies in Health Technology and Informatics*, 226:9–14.

Moral-Muñoz, J. A., Herrera-Viedma, E., Santisteban-Espejo, A., and Cobo, M. J. (2020). Software tools for conducting bibliometric analysis in science: An up-to-date review. *Profesional De La Informacion*, 29(1).

Morze, N. V., Buinytska, O. P., and Smirnova, V. A. (2022). Designing a rating system based on competencies for the analysis of the university teachers' research activities. *CTE Workshop Proceedings*, 9:139–153.

Order (2021). Rozporiadzhennia № 04 vid 25 travnia 2021 roku [Order № 04 of May 25, 2021].

Salinas, M., Giorgi, D., Ponchio, F., and Cignoni, P. (2020). ReviewerNet: A visualization platform for the selection of academic reviewers. *Computers and Graphics*, 89:77–87.

Shirazi, M. S. and Valinejadi, A. (2021). Investigating of Association between Altmetrics Activity Indicators and Citation Quality Indicators in Iranian Medical Journals. *International Journal of Preventive Medicine*, 12(1):156.

Singh, V. K., Srichandan, S. S., and Lathabai, H. H. (2022). ResearchGate and Google Scholar: How much do they differ in publications, citations and different metrics and why? *Scientometrics*, 127(3):1515–1542.

Spirin, O. M. and Vakaliuk, T. A. (2017). Criteria of open web-operated technologies of teaching the fundamentals of programs of future teachers of informatics. *Information Technologies and Learning Tools*, 60(4):275–287.

Strategy (2020). Stratehiia rozvytku vyshchoi osvity v Ukraini na 2021-2031 roky [Strategy for the Development of Higher Education in Ukraine for 2021-2031].

Vakaliuk, T. A., Ivanova, S. M., and Kilchenko, A. V. (2021a). Electronic portfolio as a tool of reflecting the results of scientific and pedagogical activities of teachers of higher education institutions. *Scientific Bulletin of Uzhhorod University. Series: "Pedagogy. Social Work"*, 1(48):53–58.

Vakaliuk, T. A., Mintii, I. S., Hamaniuk, V. A., and Ivanova, S. M. (2022). Recording the practice of teaching staff

in project activities and the preparation of winners in competitions and olympiads. *Scientific innovations and advanced technologies*, 4(6):22–34.

Vakaliuk, T. A., Spirin, O. M., Mintiy, I. S., Ivanova, S. M., and Novytska, T. L. (2021b). Scientometric indicators for evaluating the effectiveness of pedagogical research of scientists and research and teaching staff. *Modern Information Technologies and Innovation Methodologies of Education in Professional Training Methodology Theory Experience Problems*, 60:167–184.

Wiechetek, L. and Pastuszak, Z. (2022). Academic social networks metrics: An effective indicator for university performance? *Scientometrics*, 127(3):1381–1401.

Xu, Z., Yang, D., and Chen, B. (2021). Career difficulties that Chinese academic journal editors face and their causes. *Journal of Scholarly Publishing*, 52(4):212–232.

Yu, X., Wu, S., Chen, W., Zheng, W., Huang, M., Yang, L., and Zhou, S. (2021). Exploring the associations between perceived organizational support and job burnout among chinese academic journal editors: A moderated mediation model. *International Journal of Environmental Research and Public Health*, 18(22).

Transgressiveness, Innovation, and Readiness of the Modern Teacher for Change

Lyudmila L. Khoruzha[a], Victoria V. Zhelanova[b], Mariia V. Bratko[c], Svitlana P. Palamar[d] and Inna V. Leontieva[e]

Borys Grinchenko Kyiv University, 18/2 I. Shamo Blvd., Kyiv, 02154, Ukraine
{*l.khoruzha, v.zhelanova, m.bratko, s.palamar, i.leontieva*}*@kubg.edu.ua*

Keywords: Higher Education, Transgressiveness, Innovativeness, Readiness of a Modern Teacher for Innovative Activities, Relocated University.

Abstract: The article substantiates the social relevance of the phenomena of transgressiveness and innovation in all spheres of modern society, including higher education. Their essence and objective mutual determination are considered, and attention is focused on the scientific position that one of the aspects of transgressiveness of higher education is the innovativeness of the teacher, the indicator of which is his readiness for innovative activity in the conditions of transgressiveness of society. The essence of the teacher's readiness for innovative activity was considered through the analysis of its semantic components, and its structure was developed, which includes innovative-personal orientation, innovative awareness, content-innovative activity, and reflection of innovativeness. The logic and diagnostic tools of the experimental research were disclosed, the purpose of which was to determine the level of readiness of higher school teachers for innovative pedagogical activities, to compare the results obtained in relocated and non-relocated universities, as well as to identify correlations between the real level of its formation and age, length of service, availability academic degree and scientific title. However, the anonymity of the survey made it impossible to reveal all aspects of the representativeness of the study sample. A quantitative and qualitative analysis of the results of the experimental work, which are visualized, is presented. The results of the component analysis of the components of teachers' readiness for innovative activity and their statistical processing made it possible to formulate several conclusions. Among the teachers of Borys Grinchenko Kyiv University and Mykhailo Drahomanov Ukrainian State University, innovative awareness is dominant in the structure of readiness, content-innovative professional activity is in the last place, and the second and third place, respectively, is occupied by the reflection of innovativeness and innovative-personal orientation. The results of the representatives of the relocated State institution Taras Shevchenko Luhansk National University are somewhat different: there is a certain similarity of indicators for the components of innovative awareness and content-innovative professional activity. However, innovative, and personal orientation takes the second place, instead, the reflection of innovativeness is in the third place. The logic of such distribution of components is determined by the main objective factors related to the situation of repeated relocation of the institution (2014, 2022); the loss of the material and technical base, developed didactic and methodical support, and other resources of the innovative educational environment; personnel dispersion.

1 INTRODUCTION

In a rapidly changing world, education ceases to be a fixed phenomenon in the context of content, technology, resources, tools, etc. This is, as a rule, a complex, ambiguous, unstable process that must consider new challenges and trends. A teacher at a higher school in these conditions is constantly in the process of permanent changes, searching for new professional orientations, development and self-development, and improvement. To characterize such a situation, the term transgressiveness is the aptest, as it characterizes the phenomenon of crossing an impassable border, first, the border between the possible and the impossible. The literal understanding of this term means "going

[a] https://orcid.org/0000-0003-4405-4847
[b] https://orcid.org/0000-0001-9467-1080
[c] https://orcid.org/0000-0001-7162-2841
[d] https://orcid.org/0000-0001-6123-241X
[e] https://orcid.org/0000-0003-3807-1974

Khoruzha, L., Zhelanova, V., Bratko, M., Palamar, S. and Leontieva, I.
Transgressiveness, Innovation, and Readiness of the Modern Teacher for Change.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 163-172
ISBN: 978-989-758-579-1

beyond". One of the aspects of transgressiveness in the context of changes and the search for something new is innovativeness as a phenomenon of modern education, which proves its quality and effectiveness.

A basic indicator of a teacher's innovativeness is readiness for innovative activity, which actualizes the need and expediency of empirically determining the level of his/her ability to go "beyond the limits of the possible", that is, to move from traditions to innovations in higher education, to modernizing the design of higher education based on axiologising and meaningful transformation of the best experience, as well as the definition of problems, barriers, prospects of innovative growth of a modern university teacher.

Let's consider the basic phenomena of the presented research, which are transgressiveness and innovativeness. The problem of transgressiveness is devoted to the study of foreign scientists Lotz-Sisitka et al. (2015), who connect this phenomenon with the following key trends in modern higher education: reflective social learning based on the theory of abilities; phenomenology of critical thinking; sociocultural and cultural-historical theory of activity, as well as taking into account social initiatives of the information society. Saarnivaara et al. (2012), who associate transgressive learning with mentoring and supervision, express a slightly different point of view. In the domestic scientific space, transgressive issues are raised in the study of Aleksandrov (2018), who focuses on "breaking and going beyond the limits" of the traditional understanding of higher education. The personal context of transgressiveness is presented in the research of Fomenko (2014), who considers transgressiveness as a series of conscious acts that cause forward movement, the desire to expand one's world, create new material and symbolic values, develop science, technology, art, and organizational activity.

Considering the outlined scientific positions, we consider transgressiveness in two dimensions. On the one hand, it is an essential feature of a turbulent society, related to its innovativeness; on the other hand, it is a phenomenon at the personal level, which involves the ability of a modern university teacher to go beyond established educational canons and implement a movement "beyond" traditions based on innovation. The phenomenon of innovativeness became the subject of discussions at the World Summit on Innovations in Education Research, which outlined the strategic directions of reforms in education until 2030. Among them, the priorities are the following: the intensive implementation of online technologies, changing the status of the teacher from a lecturer to a facilitator, which motivates and inspires the student; to a mentor who directs him to search for information.

Herodotou et al. (2019), Kukulska-Hulme et al. (2021), who emphasize the orientation of innovative pedagogy for the future and for building the future, are devoted to the problem of innovativeness in education; Konst and Kairisto-Mertanen (2018), whose research is aimed at the implementation of innovative pedagogy in the practice of higher education, as a kind of response to the challenges of the future; Ferrari et al. (2009), who investigate the role of educators in promoting creativity and innovation in the educational process; Santos et al. (2019), Walder (2014), and Lotz-Sisitka et al. (2015), who comprehensively investigate pedagogical innovations and the success of their implementation in higher education, etc. The practical implementation of these scientific ideas is carried out by various educational institutions and universities. Thus, since 2012, the Institute of Educational Technology at The Open University (UK) has been publishing on its open resources every year a report based on the results of a study of the latest pedagogical technologies that were popular in the world during the year under review (http://www.open.ac.uk/blogs/innovating/), which it labels as already influencing educational practice or offer opportunities for the future. Such a list is also compiled for 2022 (Kukulska-Hulme et al., 2022).

For researchers of innovations in the domestic field of education, a thorough monographic study edited by Kremen (2008) will be useful. Among the works of Ukrainian scientists, we also consider it necessary to pay attention to Zhelanova's research on the parameters of innovativeness of modern higher education (Zhelanova, 2022); Khoruzha (2021), whose subject of scientific research is the socio-psychological aspects of the transition of pedagogical knowledge into innovation; Bratko and Kozyr (2020), who present a holistic vision of pedagogical innovation as a subject and object of study in higher education and others; Kozak (2021) regarding innovative activities of preschool teachers; Nezhyva and Palamar (2020), about innovative educational technologies for training future primary school teachers; Leontieva (2022), regarding modernization risks of innovative development of higher education in Ukraine.

The aspect of pedagogical innovation is pointed out by Khoruzha (2021), according to which it affects different segments of education, namely: didactic, educational, and managerial, and their components, and the criteria for identifying their innovativeness are:

- relativity (comparison of existing practices with innovation);
- rarity (recognition of the uniqueness, and originality of the innovation);
- productivity (certifies the effectiveness of the in-

novation);

- obviousness (unquestionable, clear novelty);
- efficiency (achieving effectiveness with the lowest costs);
- value (reflects the humanistic orientation of the innovation).

There is a scientific opinion on the innovative dimensions of modern higher education, among which the conceptual-innovative (correspondence to the ideas of polyparadigmatic and interdisciplinary methodology of modern education), technological-innovative (related to the implementation of a technological approach to modern higher education in the format of innovative educational technologies), communicative-innovative dimension (related to the new format of relations between teachers and students based on educational partnership) (Zhelanova, 2022). In our research, such a broad interpretation of the phenomenon of innovativeness in educational activity is narrowed down to the professional and personal aspects and actualized through the prism of readiness for innovative activity.

We understand innovativeness as a certain capacity of the subject of innovative activity to apply innovation in one or another field of activity, which is based on his/her readiness for innovative activity (innovativeness) and a complex of knowledge and skills (innovative competence), which will ensure the success of his/her professional activity on the basis innovativeness. In our opinion, the innovative activity of the teacher involves updating the content and technologies of modern higher education based on the innovative orientation of the subjects of the educational process, which lead to a departure from traditional inefficient models of professional activity in the conditions of transgressiveness of modern society.

Taking into account that the work of each researcher is characterized by a certain subjectivity in considering the phenomenon of innovations in the educational sphere, it is worth highlighting the common points that scientists pay attention to. This is the thesis that innovative approaches increase the interest of education seekers, motivation and critical thinking, increase reflection, encourage the development of higher levels of thinking, deepen personal responsibility for learning, develop the ability to interact with peers and teachers, ensure satisfaction with the professional activity of teachers and systemic, often instant, feedback with learners.

Therefore, we believe that the main parameter that characterizes the properties, features, and certain states of a modern teacher in the context of transgressiveness and innovativeness is the innovative dimension of his/her activity, presented in four directions: axiological; content, and activity; communicative, and reflective.

The *purpose* of the article is to investigate the peculiarities of the readiness of a modern teacher of a higher school for innovative activities in the context of the transgressiveness of education.

2 THEORETICAL FUNDAMENTALS OF RESEARCH

The problem of readiness in the foreign scientific discourse is presented in different ways. For example, Manasia et al. (2020) substantiated and developed a conceptual model of teacher readiness with an emphasis on sustainable development education, considering it according to the following dimensions: professional knowledge and practice, professional interaction, and self-management realized through a psychological attitude to design, implementation, evaluation, and involvement of subjects of the educational process based on interactive learning and partnership.

Mohamed et al. (2017), studying the level of readiness of future teachers for pedagogical activity according to 11 indicators of the international framework of teacher competencies, associate the achievement of the state of readiness with four vectors of pedagogical education, which correlate with the competencies outlined in the framework, their implementation, integration, application, and modeling.

In the domestic scientific space, there is a systematic study of the phenomenon of readiness, in particular readiness for innovative activity (Dychkivska, 2017; Kozak, 2021). Thus, in the research of Dychkivska (2017) regarding the readiness of future teachers of special education for innovative pedagogical activities, the problem of the motivational and value attitude of the future specialist to innovative activities, the ability to creativity and reflection, the ability to respond promptly to the dynamics of socio-economic processes, to ensure the variability of the educational process on principles of innovation. The basis of the innovative activity of a teacher of a higher school consists of two important pedagogical aspects: the study, generalization, and dissemination of pedagogical experience and the production of new ideas based on the achievements of a psychological and pedagogical science and their implementation in practice.

Our interpretation of the definition “a teacher’s readiness for innovative activity” consists in interpret-

ing it as the professional and personal formation of a modern teacher, which consists of the following basic components:

1. Innovative and personal orientation.
2. Innovative awareness.
3. Content-innovative activity.
4. Reflection on innovativeness.

We consider it appropriate to consider in more detail the elements that make up each of the outlined components, on which the experimental part of our research will be based.

The innovative and personal orientation of the teacher is a set of motives, needs, values, and attitudes that reflect a stable value attitude to innovativeness; adaptability in conditions of social and personal uncertainty; the need to update the strategy of professional activity based on transgressiveness. We consider the orientation to innovation as a basic value of the development of higher education to be a sign of a teacher's innovative and personal orientation; awareness of the need to be adaptive in conditions of social and personal uncertainty; the need to change and update the strategy of one's professional activity.

Innovative awareness presupposes erudition regarding fundamental knowledge and achievements of modern science and trends in higher education and innovations, and general awareness of innovations in education.

Content-innovative activity – this component is related to the constant updating of the content of educational disciplines based on taking into account the innovative guidelines of strategic regulatory documents, educational standards, and the innovative potential of educational programs; implementation of innovative content in the educational process through an innovative format of relationships between subjects of the educational process (facilitation, mentoring, coaching, pedagogical partnership) and innovative research projects; renewal of didactic and methodical support of educational disciplines based on innovation; implementation of innovative learning technologies and/or alternative resources and IR tools within the open innovative educational environment.

Reflection of innovativeness is an awareness of one's innovative potential in professional activity, including a feeling of lack of knowledge regarding technological support for the implementation of pedagogical innovations; assessment of the innovativeness of one's professional activity and forecasting of its results and prospects; taking into account the level of student satisfaction with the quality of education in the context of its innovativeness; responsibility for successes and failures in professional activity, including its innovative component.

3 RESEARCH RESULTS

To determine the level of readiness of higher school teachers for innovative pedagogical activity and to identify correlations of its level with age, work experience, the presence of a scientific degree, and academic title, a survey of scientific and pedagogical workers of higher education institutions of Ukraine was conducted.

The questionnaire consisted of twenty questions grouped into four blocks:

I. Innovative and personal orientation of the individual (correlated with axiological, motivational, adaptive aspects of readiness for innovative activity)

II. Innovative content of professional pedagogical activity (related to substantive content at the state-normative and corporate levels)

III. Innovativeness in professional activity (the parameters of which are a new format of relations between the subjects of the educational process, the introduction of innovative educational tools)

IV. Reflection and self-assessment (correlates with the reflective and analytical mechanisms of the individual).

167 respondents from three universities took part in the survey: Borys Grinchenko Kyiv University (hereinafter KUBG), Mykhailo Drahomanov Ukrainian State University (hereinafter UNU), and the relocated SI "Taras Shevchenko Luhansk National University" (hereinafter LNU). However, the anonymity of the survey made it impossible to reveal all aspects of the representativeness of the study sample.

The questionnaire was aimed not only at diagnosing the basic components of a teacher's readiness for innovative activity but also at comparing the readiness for such activity of relocated and non-relocated teachers of higher education institutions in Ukraine.

Note that we interpret the teacher's "readiness for innovative activity" as his professional and personal education, which includes: innovative and personal orientation (valuable attitude to innovativeness; adaptability in conditions of social and personal uncertainty; the need to update the strategy of professional activity); innovative awareness of fundamental knowledge, achievements and modern trends of higher education; content-innovative activity of the

teacher (taking into account the guidelines of strategic normative documents, educational standards and the potential of educational programs regarding the content support of innovative activity, as well as the practical context of innovation (subject-subject format of relationships, didactic-methodical support of educational disciplines on the basis of innovation, introduction of innovative learning technologies); reflection of the results of innovative activity (awareness of potential, evaluation of own achievements and satisfaction of students, forecasting prospects for the development of professional innovativeness). The obtained results of the conducted questionnaire for each component of the teacher's readiness for innovative activity, as well as the generalized result, are visualized in the diagrams below. Figure 1 graphically presents the obtained data regarding the study of the teacher's level of readiness for innovative activity according to the component "Innovative and personal orientation of the individual".

According to the conducted research, 60.00% of the teachers of KUBG, 50% of LNU, and 69.09% of UNU have a high level of innovative and personal orientation. The level above the average is observed in 29.39% of teachers of KUBG, 30.73% – of LNU, and 24.54% of UNU. The average level of innovative and personal orientation was found in 6.94% of teachers of KUBG, 13.66% – of LNU, and 5.45% of UNU. A low level was diagnosed in 2.04% of teachers of KUBG, 2.44% – of LNU, and 0.92% of UNU.

Thus, a high level of innovative and personal orientation prevails among teachers, they demonstrate a valuable attitude to innovativeness; modern trends in higher education; adaptability in conditions of social and personal uncertainty; declare the need to update the strategy of professional activity.

A high level of readiness of the teacher for innovative activity according to the component "Innovative awareness" is observed in 67.75% of teachers of KUBG, 55.12% – of LNU, and 77.28% of UNU. The level above the average was found in 28.57% of the teachers of KUBG, 32.20% – of LNU, and 17.28% of UNU. The average level of innovative awareness was found in 3.26% of teachers of the KUBG, 8.29% – of LNU, and 3.63% of the UNU. A low level was diagnosed only in representatives of LNU – 1.22%.

Therefore, the majority of teachers have a high level of readiness for innovative activity according to the "Innovative awareness" component, i.e. they demonstrate awareness and erudition regarding fundamental knowledge and achievements of modern science and trends in higher education and innovations; general awareness of innovations in education. The results of the teachers' survey are shown in figure 2.

Analysis of the research results shown in figure 3 allows us to conclude the level of the teacher's readiness for innovative activity according to the component "Substantive and innovative professional activity". Thus, a high level was found in 42.86% of teachers of KUBG, 30.73% – of LNU, and 44.55% of UNU. The level of readiness of the teacher for innovative activity according to the component "Substantive and innovative professional activity" is above average found in 33.47% of the teachers of KUBG, 36.34% – of LNU, and 29.09% of UNU. The average level was diagnosed in 13.88% of the teachers of KUBG, 20.73% – of LNU, and 16.36% of UNU. A low level was diagnosed in 4.08% of the teachers of KUBG, 4.88% – of LNU, and 4.54% of teachers of UNU.

The results obtained under this component indicate that among teachers there are specialists who apply innovativeness in their practical activities: constant updating of the content of educational disciplines based on taking into account the innovative guidelines of strategic regulatory documents, educational standards, the innovative potential of educational programs; innovative research projects; renewal of didactic and methodical support of educational disciplines based on innovation; implementation of innovative learning technologies and/or alternative resources and IR tools within the open innovative educational environment.

Figure 4 graphically presents the results of studying the level of readiness of the teacher for innovative activity according to the component "Reflection of innovativeness".

According to the conducted research, 60.82% of the teachers of KUBG, 44.39% of LNU and 73.64% of UNU have a high level of reflection and self-esteem. The level above the average is observed in 33.47% of teachers of KUBG, 40.24% – of LNU, and 19.10% of UNU. The average level of reflection and self-assessment was found in 4.08% of the teachers of KUBG, 13.90% – of LNU, and 6.36% of UNU. A low level was diagnosed only in representatives of the KUBG – 0.41%.

That is, a high level of reflection and self-assessment prevails among teachers, they demonstrate awareness of their innovative potential in professional activity; adequate evaluation of the innovativeness of their professional activity, forecasting of its results and prospects; responsibility for successes and failures in professional activity, including its innovative component.

The analysis of the generalized results allows us to conclude the structure of the teacher's readiness for

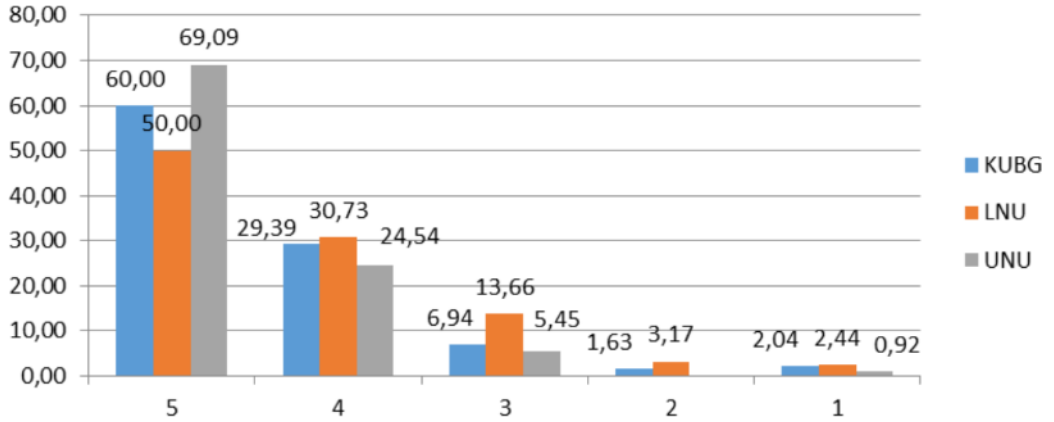


Figure 1: The results of the study of the level of the teacher's readiness for innovative activity according to the component "Innovative and personal orientation of the individual".

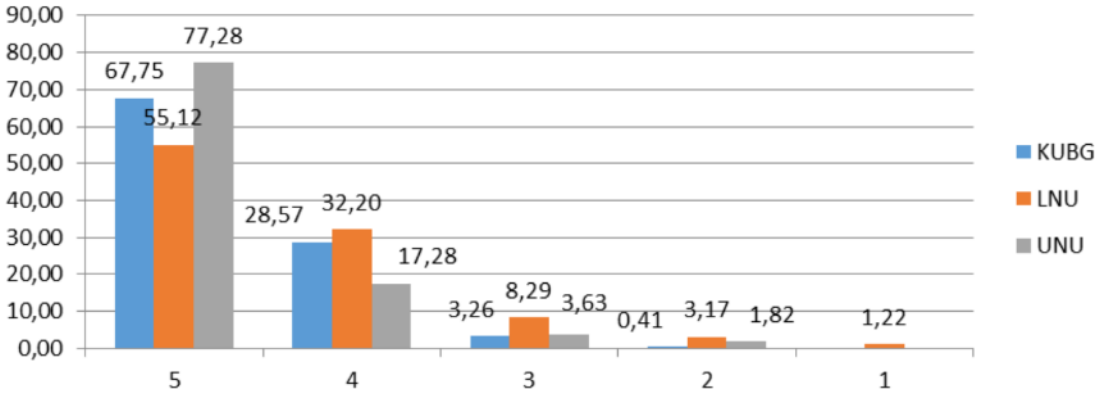


Figure 2: Results of the study of the level of readiness of the teacher for innovative activities according to the component "Innovative awareness".

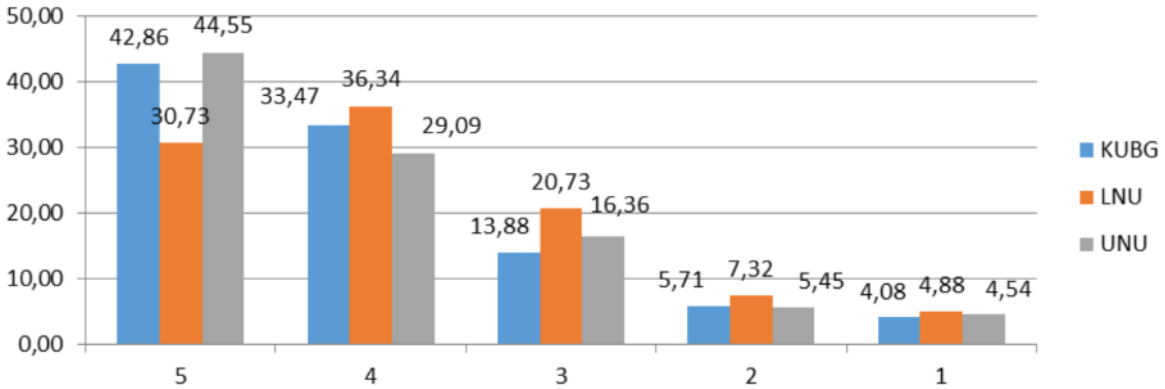


Figure 3: Results of the study of the level of readiness of the teacher for innovative activity according to the component "Content-innovative professional activity".

innovative activity. Thus, among the teachers of Borys Grinchenko Kyiv University and Mykhailo Drahomanov Ukrainian State University, the first place is innovative awareness, the second place is a reflection of innovativeness, the third place is innovative-personal orientation, and the fourth place is a content-innovative professional activity. For representatives of the Taras Shevchenko Luhansk National University, the results are slightly different, so the innovative and personal orientation is in second place, and the reflection of innovativeness is in third place.

Therefore, it is obvious that teachers of Boris Grinchenko Kyiv University and Mykhailo Drahomanov Ukrainian State University have a higher

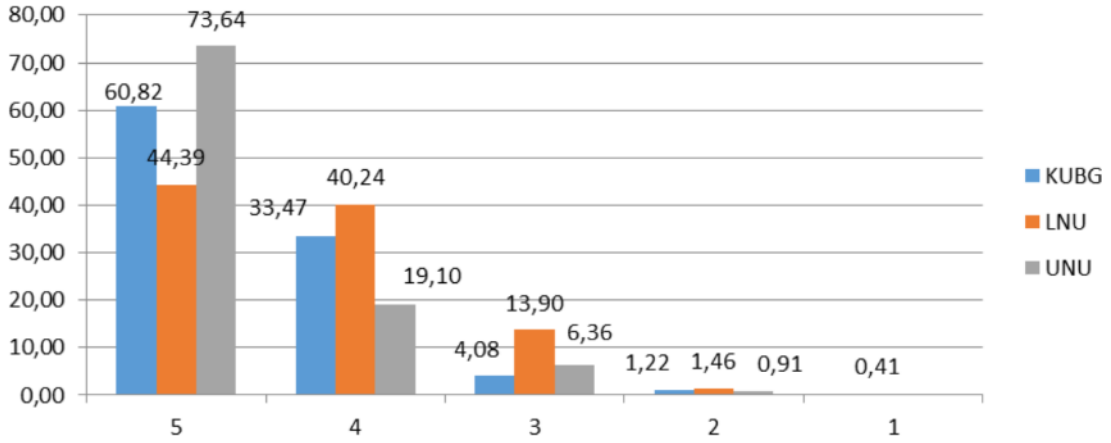


Figure 4: Results of the study of the level of readiness of the teacher for innovative activity according to the component "Reflection of innovativeness".

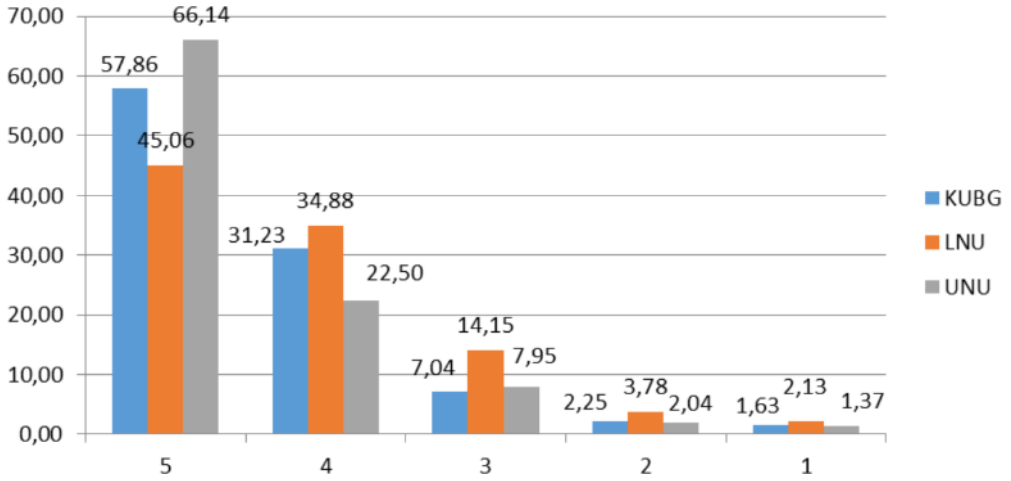


Figure 5: The results of the study of the teacher's readiness for innovative activities.

level of readiness for innovative activities than teachers of SI " Taras Shevchenko Luhansk National University" in all basic components.

In our opinion, the main objective factors of the decrease in the level of teacher readiness for innovative activity among teachers of the SI "Taras Shevchenko Luhansk National University" are the situation of repeated relocation of the institution (2014, 2022); loss of the material and technical base, developed didactic and methodical support and other resources of the innovative and educational environment; personnel dispersion.

To confirm the results obtained with the help of qualitative analysis and to determine the difference between the indicators of teacher readiness for innovative activity of the respondents of Borys Grinchenko Kyiv University, Mykhailo Drahomanov Ukrainian State University and SI "Taras Shevchenko Luhansk National University", non-parametric Mann-Whitney U test was used (table 1).

The analysis of the results presented in the table allows us to conclude that there is a statistically significant difference in the level of teacher readiness for innovative activity between the groups of teachers of KUBG/UNU and LNU on the component "Reflection of innovativeness" at a significance level of p=0.0001; "Content-innovative professional activity" at the level of significance p=0.001; "Innovative awareness" and "Innovative and personal orientation of the individual" at the level of significance p=0.005.

To assess the statistical relationship between the constituent components of the teacher's level of readiness for innovative activity according to such indicators as age, seniority, scientific degree, and academic title, obtained as a result of the conducted empirical research, the Pearson correlation coefficient, which is a parametric statistical criterion, was used. The statistical analysis allowed us to reveal relationships between indicators at the significance level of 0.05 and 0.01 (at $p<.01$ and $p<.05$). The results are shown in

Table 1: Calculation of Mann-Whitney U test for comparing the results of the study of the level of teacher readiness for innovative activity among teachers of different higher education institutions.

Variables	Sum of ranks (KUBG/UNU)	Sum of ranks (LNU)	U	Level of significance
Innovative and personal orientation of the individual	3087.00	1963.00	882.00	.0015
Innovative awareness	3861.00	1215.00	806.00	.0013
Content-innovative professional activity	2798.00	2251.00	766.50	.001
Reflection of innovativeness	3074.00	1880.00	495.00	.0001

table 2.

Thus, we can conclude that there is a high level of statistical significance between the academic title and all components of the level of readiness of the teacher for innovative activities; scientific degree, and age with innovativeness in professional activity, reflection, and self-assessment. Statistically reliable relationships were found between seniority and all components of the teacher's level of readiness for innovative activities; scientific degree and age with the innovative and personal orientation of the individual and innovative content of professional pedagogical activity.

4 CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The phenomena of transgressiveness and innovativeness reflect the contradictory features of modern society, associated with its turbulence, uncertainty, instability, and psychological tension, and become challenges facing higher education today. The professional and personal indicator of the specified objective social phenomena is the readiness of a higher school teacher for innovative professional activity, the structure of which includes several components: innovative personal orientation, innovative awareness, content-innovative professional activity, and reflection of innovativeness. Quantitative and qualitative analysis of the results of the teachers' survey, as well as their statistical processing, proved the similarity of indicators of the readiness of teachers of all three universities for the components of innovative awareness and content-innovative professional activity. However, the results of teachers of LNU differ according to the components of innovative-personal orientation and reflection of innovativeness (innovative-personal orientation takes second place, and reflection of innovativeness is in third place). We believe that the logic of this distribution of components of readiness for innovative activity of LNU teachers is conditioned by the main objective factors related to the situation of repeated relocation of the institution (2014, 2022); the loss of the material and technical base, developed didactic and methodical support and other resources of the innovative educational environment; personnel dispersion. It was concluded that there is a high level of statistical significance between the academic title and all components of the teacher's readiness for innovative activities; at the same time, a significant dependence was established between academic degree and age and content-innovative professional activity and reflection of innovativeness. Statistically reliable connections were found between seniority and all components of the teacher's readiness for innovative activities; at the same time, academic degree and age correlate with the innovative and personal orientation of the individual and the innovative awareness of the teacher. Therefore, the readiness of the teachers of KUBG, UNU, and LNU for innovative professional activity was internalized only at the level of motivation and awareness but did not turn into a practical toolkit regarding the content and technological support of the innovative professional activity. That is, the problem of increasing the level of readiness of the teacher for innovative professional activity according to the component of content-innovative professional activity must be raised at the level of declaring innovative content at both the state (legislative) and institutional (corporate) levels in the format of regulatory documents and educational programs of innovative orientation, through the strengthening of their practical component, related to the provision of subjective activity of teachers regarding the implementation of skills, as a component of content-innovative professional activity.

Table 2: The results of the correlation analysis of the constituent components of the teacher's level of readiness for innovative activity by indicators.

Indexes	Level of significance			
	Age	Seniority	Scientific degree	Academic title
Innovative and personal orientation of the individual	.37*	.25*	.25*	.41**
Innovative awareness	.28*	.31*	.24*	.43**
Content-innovative professional activity	.47**	.27*	.53**	.51**
Reflection of innovativeness	.43**	.23*	.54**	.67**

* – $p \leq .01$; ** – $p \leq .05$

REFERENCES

Aleksandrov, D. (2018). Quo Vadis?: Transgression of modern institute of education. *Scientific Bulletin Melitopol State Pedagogical University. Series: Pedagogy*, (20):12–16. http://magazine.mdpu.org.ua/index.php/nv/issue/view/88.

Bratko, M. V. and Kozyr, M. V. (2020). Pedagogical innovation. https://elibrary.kubg.edu.ua/id/eprint/32807/.

Dychkivska, I. M. (2017). *Pidhotovka maybutnikh vykhovateliv doshkilnykh zakladiv do innovatsiynoyi pedahohichnoyi diyalnosti: teoriya i metodyka [Preparation of future educators of preschool institutions for innovative pedagogical activity: theory and methodology]*. O. Zen, Rivne.

Ferrari, A., Cachia, R., and Punie, Y. (2009). Innovation and Creativity in Education and Training in the EU Member States: Fostering Creative Learning and Supporting Innovative Teaching: Literature review on Innovation and Creativity in E&T in the EU Member States (ICEA. Technical Note JRC 52374, Luxembourg. https://www.researchgate.net/publication/265996963.

Fomenko, K. I. (2014). Transgressive "Me" in the structure of personality's self-consciousness. *Problems of Modern Psychology*, (26):573–584. http://nbuv.gov.ua/UJRN/Pspl_2014_26_47.

Herodotou, C., Sharples, M., Gaved, M., Kukulska-Hulme, A., Rienties, B., Scanlon, E., and Whitelock, D. (2019). Innovative Pedagogies of the Future: An Evidence-Based Selection. *Frontiers in Education*, 4. https://doi.org/10.3389/feduc.2019.00113.

Khoruzha, L. (2021). Socio-psychological aspects of the transformation of the pedagogical knowledge into innovation. *Educological discourse*, 35(4):103–117. https://doi.org/10.28925/2312-5829.2021.47.

Konst, T. and Kairisto-Mertanen, L. (2018). *Innovation Pedagogy: Preparing Higher Education Institutions for Future Challenges*. Turku University of Applied Sciences, 2 edition.

Kozak, L. (2021). Formation of readiness of future teachers of preschool education to innovative activity on the principles of project-based learning. *Pedagogical education: theory and practice. Psychology. Pedagogy*, (35 (1)):71–77. https://doi.org/10.28925/2311-2409.2021.3510.

Kremen, V. H., editor (2008). *Fenomen innovatsiyi: osvita, suspil'stvo, kultura [The phenomenon of innovation: education, society, culture]*. Pedahohichna dumka, Kyiv. https://tinyurl.com/2dshupw7.

Kukulska-Hulme, A., Bossu, C., Coughlan, T., Ferguson, R., FitzGerald, E., Gaved, M., Herodotou, C., Maina, M., Prieto-Blázquez, J., Rienties, B., Sangrà, A., Sargent, J., Scanlon, E., and Whitelock, D. (2022). Innovating Pedagogy 2022. Open University Innovation Report 10, Milton Keynes. https://oro.open.ac.uk/84152/.

Kukulska-Hulme, A., Bossu, C., Coughlan, T., Ferguson, R., FitzGerald, E., Gaved, M., Herodotou, C., Rienties, B., Sargent, J., Scanlon, E., Tang, J., Wang, Q., Whitelock, D., and Zhang, S. (2021). Innovating Pedagogy 2021. Open University Innovation Report 9, Milton Keynes. https://oro.open.ac.uk/74691/.

Leontieva, I. (2022). Realities of innovation in the development of higher pedagogical education, or when the Internet disappears. *Pedagogical education: theory and practice. Psychology. Pedagogy*, (38 (2)):57–62. https://doi.org/10.28925/2311-2409.2022.389.

Lotz-Sisitka, H., Wals, A. E., Kronlid, D., and McGarry, D. (2015). Transformative, transgressive social learning: rethinking higher education pedagogy in times of systemic global dysfunction. *Current Opinion in Environmental Sustainability*, 16:73–80. Sustainability science; https://doi.org/10.1016/j.cosust.2015.07.018.

Manasia, L., Ianos, M. G., and Chicioreanu, T. D. (2020). Pre-Service Teacher Preparedness for Fostering Education for Sustainable Development: An Empirical Analysis of Central Dimensions of Teaching Readiness. *Sustainability*, 12(1):166. https://doi.org/10.3390/su12010166.

Mohamed, Z., Valcke, M., and De Wever, B. (2017). Are they ready to teach? Student teachers' readiness for the job with reference to teacher competence frameworks. *Journal of Education for Teaching*, 43(2):151–170. https://doi.org/10.1080/02607476.2016.1257509.

Nezhyva, L. and Palamar, S. (2020). Innovative technologies in the literary education of future primary school teachers. *Educological discourse*, 31(4):129–142. https://doi.org/10.28925/2312-5829.2020.4.9.

Saarnivaara, M., Ellis, C., and Kinnunen, H.-M. (2012).

Transgressive Learning: A Possible Vista in Higher Education? In Tynjälä, P., Stenström, M.-L., and Saarnivaara, M., editors, *Transitions and Transformations in Learning and Education*, pages 307–325. Springer Netherlands, Dordrecht. https://doi.org/10.1007/978-94-007-2312-2_18.

Santos, J., Figueiredo, A. S., and Vieira, M. (2019). Innovative pedagogical practices in higher education: An integrative literature review. *Nurse Education Today*, 72:12–17. https://doi.org/10.1016/j.nedt.2018.10.003.

Walder, A. M. (2014). The Concept of Pedagogical Innovation in Higher Education. *Education Journal*, 3(3):195–202. https://doi.org/10.11648/j.edu.20140303.22.

Zhelanova, V. V. (2022). The innovative dimension of modern higher education: Analysis of directions. *Innovative Pedagogy*, 50(1):145–148. http://innovpedagogy.od.ua/archives/2022/50/part_1/30.pdf.

The Architectural and Artistic Strategy of Ecologization as a Mental-Spatial Way of Realizing the Sustainable Development Goals

Vasyl M. Fedorets[1,2][a] and Oksana V. Klochko[3][b]

[1]*Vinnytsia Academy of Continuing Education, 13 Hrushevskoho Str., Vinnytsia, 21050, Ukraine*

[2]*State Higher Educational Instiution "University of Educational Management" of the NAES of Ukraine, 52A Sichovykh Striltsiv Str., Kyiv, 04053, Ukraine*

[3]*Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, 32 Ostrozhskogo Str., Vinnytsia, 21100, Ukraine*

bruney333@yahoo.com, klochkoob@gmail.com

Keywords: Ecologization, Environmentalization, Greening, Aestheticization, Sustainable Development Goals, Pedagogy, Anthropocosmic Consciousness, Health, Competence, Architecture, Physical Education Teacher, Art.

Abstract: The article presents the development of "Architectural and artistic strategy of ecologization", which is considered as a mental-spatial way of realizing the goals of sustainable development and ecologization of the educational process. An important component of this strategy is the actualization of anthropocosmic consciousness, which forms the perception of the earthly world as a home, and also promotes consideration of the human dwelling as a special world. Viewing the earthly world as a home is a psychological and sociocultural prerequisite for ecologization and the formation of the ecophilic man of the future – Homo ecologicus. "physical education teachersstrategy of ecologization" is developed and implemented on the example of ecologization and aestheticization of the health-preserving competence of teachers in the conditions of postgraduate education. Using the example of "Architectural and artistic strategy of ecologization", we represent the humanistically oriented idea of soft ecologization, which consists in the primary and dominant application of humanitarian (psychological, artistic, social, pedagogical) methods and technologies as system-organizing and determining factors in the development of ecophilic consciousness. When analyzing the results of training of teachers in the conditions of postgraduate education using "Architectural and artistic strategy of ecologization", the positive dynamics of their educational achievements was determined.

1 INTRODUCTION

By nature, human is creative, Homo Creator (Latin). A special creative and at the same time systematic and multidimensional way of adapting a person to the world and life is his "own" "new nature" – a culture in the system of which architecture is one of the central phenomena. Culture is a specifically human, meaningful, aestheticized way of interaction between Homo Sapiens and nature, which is variable and effective. The architectural tradition, being one of the determining and system-organizing spheres in culture and life, including everyday life, contains powerful integrative, representative and worldview potentials in which the cosmogonic ideas of a certain group of people, a people or a specific artist are condensed. In this study, the indicated tradition is interpreted broadly and includes architecture as a high art, science and highly complex practice, as well as the perception and reinterpretation of architecture by the dominant culture and personality as a special spatial "cosmogonistic-ethical-value-sense system" that is present in the everyday life of a person in her life world (Lebensvelt in German) (according to E. Husserl) (Lobo, 2022). In this context, from the standpoint of anthropology and cultural studies, the ecological value understanding of architecture is relevant not only and not so much as a science or a professional field, but first of all as an attributive human phenomenon (anthropological phenomenon), which is embedded in their nature.

Architecture in the anthropocultural sense at the level of everyday life is a purely pragmatic solution to the problem of housing. In turn, the creation of housing is revealed as archetypal (essentially as an innate species ability) (Erazo Andrade et al., 2022) defined activity, the essence of which is a priori assigned to a person by his nature. Accordingly, do-

[a] https://orcid.org/0000-0001-9936-3458

[b] https://orcid.org/0000-0002-6505-9455

Fedorets, V. and Klochko, O.
The Architectural and Artistic Strategy of Ecologization as a Mental-Spatial Way of Realizing the Sustainable Development Goals.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 173-190
ISBN: 978-989-758-579-1

mestic housing, which is a manifestation of the "architectural dimension" of human nature, as well as the specifics of human cultures, are considered as one of the prerequisites for the development of aesthetic consciousness and ethics, which is realized by understanding the complexity, multidimensionality, hierarchy, spatiality, and systematicity of the surrounding world (Cosmos), which is earthly.

Relevant in the aspect of realization of the goals of sustainable development (Guerra et al., 2022) and ecologization of education (Yevtuch et al., 2021b; Su and Zhao, 2023; Corpuz et al., 2022) and the sociocultural sphere in general is that architecture and aesthetics, which is connected with it (more precisely, inseparable), reveal the ways to the formation of human anthropocosmic consciousness. In such a high and at the same time anthropologically specific (in the sense of the corresponding essence of human as a species and human as an individual) consciousness, Cosmos (Ancient Greek: $Κοσμοζ$ – in the sense of a harmonious and aesthetic world) is reflected in sufficient completeness and in accordance with cultural specificity. In essence, the earthly world is reflected and/or re-modeled as harmonious, majestic, orderly, ethical, ergonomic, multidimensional. A simple manifestation of such an anthropocosmic consciousness is admiration for the infinity and beauty of the starry sky, which opens up the opportunity for a person to understand both his own smallness and comprehend himself as a unique being, as well as see his own harmony with the Cosmos and discover the boundless Cosmos in himself, that is, the world in himself.

The appeal to the idea and phenomenology of the Cosmos, which is reflected in art and architecture, is revealed, first of all, in its original ancient Greek understanding as an ordered and harmonious world. Modern interpretations of the Cosmos have some similar meanings and interpretations to the ancient Greek ones, which are determined by the ideas of the interaction between order (in this interpretation as a manifestation of harmony, balance) and chaos, as presented in the classic work by Prigogine and Stengers (1984) "Order out of chaos: Man's new dialogue with nature". The educational and socio-cultural basis for the implementation of the Sustainable Development Goals is ecologization, which, in accordance with the ideas of "human qualities" by Peccei (1977) is aimed at forming a new person as a carrier of environmental consciousness. The metacognitive and strategic aspects of ecologization are interpreted as worldview and cosmogonic, which determines the need to reveal some ideas about reality as an ordered harmonious earthly Cosmos, the anthropologically significant aspects of which are transformed in culture into the idea of home and architectural traditions. Thus, the aforementioned "architectural dimension" of human nature is conceptually linked to the cosmic dimension, which is a deep anthropological prerequisite for anthropospace consciousness. Accordingly, as a significant component of ecologization, there is a need to consider Cosmos and, above all, the Earth as Earthly Cosmos. This is realized through the actualization of anthropocosmic consciousness, which includes the need to consider some anthropo-ecologically significant aspects of the phenomenology of Cosmos in relation to architectural phenomena.

The ecologically oriented disclosure of the phenomenology of the Cosmos determines the following topical areas of this problematization as analysis and reference to phenomena: systemicity (Cosmos as a system), diversity (Cosmos as a system in which various phenomena are integrated), harmony (Cosmos as a special "complete" harmony, order), vitality (Cosmos as a "living being" as a "living world", which is a prerequisite and environment of life), cognitive (Cosmos as a cognitive environment or a world that promotes the disclosure of intelligence), Cosmos as a home and as a relatively complete, safe and comfortable world. Let us present this in more detail.

The Cosmos as an ordered world in which antagonistic forces (e.g., fire and water) coexist harmoniously is one of the first mythologized representations that clearly and visually reveals the phenomenology of a system that has: its goal – the sustainability, harmony and "comfort" of the existence of the Cosmos itself and its components; the presence of many different levels of organization – the worlds of minerals, plants, animals, people, etc.; integrity, integrity, interdependence of components. Updating the concept of space as a system contributes to the development of systemic thinking and understanding of the multidimensionality and interconnectedness and interdependence of the Earth's world. The comprehension of the systemic nature of space or an ecological system, in turn, also underlies the development of cognitive attitudes aimed at preservation, at delicate intervention (or not intervention) in complex ecological processes.

Diversity reveals the Cosmos as a megasystem in which various phenomena are integrated, thus ensuring its existence. In this aspect, let us recall the cybernetic law – "the law of requisite variety" by Ashby (1968). Its essence lies in the fact that a system can exist sustainably only if it has the necessary diversity of elements and subsystems. If this diversity is reduced, the system will begin to collapse. This pattern is inherent in ecological systems, including the "mega-ecosystem" of the Earth. Accordingly, the pre-

scribed idea of diversity presented in the format of the law of necessary diversity of the system determines a meaningful, not formal, understanding by a specialist of the problem of biodiversity conservation as a determining condition for the existence of life on Earth, as well as a relevant factor in preserving human health (Marselle et al., 2021). Thus, the use of the idea of diversity, which is actualized through the understanding of Cosmos as a harmonious complex world with a variety of phenomena and their manifestations, is crucial in the development of a specialist's understanding of the phenomenology of ecological systems and represents an important cognitive component of environmental consciousness.

Cosmos as a manifestation of harmony: The essence of the concept of the Cosmos in its original Greek sense is based on the concept of harmony. In other words, the Cosmos is a harmonized, ordered, balanced and multidimensional world that determines its sustainable existence. Accordingly, the modern concept of sustainable development reflects the ancient ideas of harmony, an important aspect of which is balanced development.

Cosmos as a vital phenomenon: The idea of the vital nature of the Cosmos has been known since ancient Greek times. At that time, the cosmos was considered a living being. To a certain extent, we prescribe these ideas, specifying the presence of a significant amount of living matter in the earthly Cosmos – flora, fauna, and humanity. The importance of a specialist's comprehension of the vitality of the Cosmos is an emotional, value, and cognitive prerequisite for the preservation of terrestrial ecosystems. At the anthropological level, this is largely determined by such a human quality as biophilia, which is love and goodwill toward living things. Biophilia is an innate human quality, a characteristic of human nature (Fromm, 1956; Wilson, 1984), the actualization of which is an important factor in the formation of environmental awareness (Barbiero and Berto, 2018). In this aspect, the biophilic trend in architecture (Yaseen and Mustafa, 2023) and design is interesting.

The cognitive dimension of the Cosmos is revealed through its complex structuredness, systematicity, and multidimensionality. That is, both the structure and the existence of the Cosmos contain cognitive nature as a special "natural superrationality". The idea of the cognitive nature of the Cosmos, which is revealed through the interaction of the Earth and humanity, is reflected in the concept of a reasonable Earth shell – the noosphere. The interest in the spatiality of the Cosmos (in the sense of the Earth's Cosmos) and its cognitive nature, as well as its integrity and systemicity, is a significant component of the development of spatial, critical and systemic thinking, as well as the formation of anthropospace consciousness. These cognitive factors are also intellectual prerequisites for the development of the metacognitive level of consciousness (Yevtuch et al., 2021a). Significant aspects of the metacognitive level of consciousness are goal setting and the ability of a person to reflect and critically evaluate themselves and their mental and other capabilities and perspectives. The development of metacognition is an important aspect of environmental consciousness. This is due to the fact that in the intellectual dimension of environmental consciousness, the following are significant: goal setting and understanding and critical evaluation of goals, as well as the ability to determine the limits of both one's capabilities and the resources of the environment. The ability to define the limits of one's capabilities, including intellectual, emotional and volitional, personal, and to take into account the resources of the environment is a feature not only of a competent professional but also of a harmonious and mature personality with developed intellect.

Cosmos can be perceived and interpreted as a home and as a relatively complete, safe and comfortable world. Such perceptions contextually become conceptual and ideological attitudes in the design and construction of houses and other architectural structures. Accordingly, in the construction and arrangement of housing, the idea of space as a harmonious, comfortable, safe world with the above attributes – systematic, diverse, harmonious, vital, cognitive – is laid down. In the modern world, this idea of the cognitive nature of the world (Cosmos) is realized in the technologies of the smart home (Sovacool and Furszyfer Del Rio, 2020) and the smart city (Ahad et al., 2020), which are energy-efficient and environmentally oriented architectural structures that interact closely with the environment. Thanks to these technologies, there is a deepening of integration in the system of interaction "Man – Earth Space". Ecologically and anthropologically oriented cognitivity, which is embodied in a smart home as a spatial anthropo-cosmic phenomenon, is a determining factor in integration, which is realized through synergies, mutual complement, interpenetration, and a careful and ethical attitude towards nature.

As a manifestation of anthropocosmic consciousness, cognitive activity directed to the environment and represented as a smart home, smart city, and smart environment becomes a prerequisite for the effective implementation of a new ecological and global ethics. The ideas of anthropocosmism and the intellectual potential of anthropocosmic consciousness have largely determined the global, cosmic and hu-

manistic formats of such social and religious movements as Freemasonry, Buddhism, Taoism, Confucianism, etc., which have an environmental focus and an orientation towards preserving the Earth. In this aspect, the study of Lu and Jover (2019), which presents a consideration of a Chinese university from the perspective of the potential of anthropocosmism, which is one of the central concepts in Confucian holistic humanism. Based on the concepts and interpretations presented above, ecologization, which is traditionally understood as an anthropo-psychological and sociocultural way of realizing the goals of sustainable development, is also considered within this methodological system as a special anthropocosmic phenomenon that has a close mutually reinforcing relationship with architecture and art.

The specificity of this anthropocosmic consciousness is its integrity, closeness or even "transition" to the theocratically oriented and/or magical perception of reality. From the point of view of ecologization, as a way of realizing the goals of sustainable development, we define it as an actual purposeful development of environmental consciousness, taking into account the phenomenon of anthropocosmic consciousness, which is interesting and significant, first of all, for its integrity, systematicity, harmony, aestheticism, and in essence, originally determined and existing contextually ethical dimension in the system of "Human-World" interaction. Human is fascinated by the grandeur, beauty, sophistication, perfection, harmony and grandeur of the world. This creates natural or anthropocosmic prerequisites for harmonious behavior and a delicate, kind, valuable, moral attitude towards the environment and the Earth.

Ecologization as a modern cross-cutting systemic trend integrates many components – educational, pedagogical, psychological, ethical, social, cultural, political, artistic, architectural, philosophical, etc. Let us consider this in more detail. The determining factor in this area is pedagogical ecology (Matsunobu, 2017; Klochko et al., 2022; Yevtuch et al., 2021b), which provides practical, technological and methodological support for the implementation of ecological education for both children and adults (Onopriienko et al., 2021). In this aspect, the opinion of Bonnett (2021) about the expediency of human (in the sense of total) "management" of nature in its traditional format is important. Our study reflects the results of applying adult ecological education, namely for the training of physical education teachers. Accordingly, in the system of pedagogical ecology, the potentials (knowledge, value, ethical) of pedagogy, psychology, ecological ethics, ecology, art and humanities in general are integrally actualized for the purpose of ecologization.

Currently, the direction of ecologization of the philosophy of education is significant (Affifi et al., 2017), which is considered as a philosophical and methodological basis for ecologization. In the philosophical and methodological directions, the development of Bonnett's phenomenological ecology (Bonnett, 2019) is important, which is considered as an important component of ecologization. The ethical direction of ecologization is represented by ecoethics and ecologization of the philosophy of education, within which the idea of "earth ethics" by Joldersma (2017) is original, revealing the importance of human responsibility to the planet Earth.

We have developed a telos (in the sense of the Earth) and an existentially oriented methodology of ecologization (Yevtuch et al., 2021b), which is essentially close to the idea of "earth ethics" by Joldersma (2017) and the direction of phenomenological ecology updated by Bonnett (2019). Accordingly, we have formed a system of methodological concepts aimed at ecologization: "Tellus-Anthropic Convergence", "Good of the Dialogue of Man and Earth", "Arete of the Earth", "Compliance with active impact on the Earth", "Tellus-Anthropic Harmonization", "Epistrophe of the Earth" (Yevtuch et al., 2021b).

The use of art can to some extent be considered a mainstream direction that actively, deeply and expressively affects a person, acting on his or her emotional, volitional, value and volitional, existential, aesthetic and ethical spheres. Our development of the ecologization of the health-preserving competence of physical education teacher using architecture, including the actualization of the anthropospace component, also applies to the use of art. The gender approach is also actively used in the application of ecologization with the use of art. Rodríguez-Labajos and Ray (2021) identify six ways of gender artistic activism (or "artivism").

An important pedagogical and cultural direction of ecologization is ecomusicology (Gautier, 2016), which has a certain connection with structuralism and multinationalism. Matsunobu (2017), based on the structure of ecomusicology, actualizes the idea of "ecomusicality", which is crucial in his pedagogical system. Porri et al. (2023) actualizes ecomusical influences in the pedagogical system within the integrative application of transgressive pedagogy and eco-creative and innovative approaches.

An important contribution to ecologization is realized in ecological architecture and ecodesign. In this development of ecologization of health-preserving competence of physical education teacher, architec-

tural and artistic aspects together with the idea of actualization of anthropocosmic consciousness and aesthetization are leading. At the same time, we are guided by methodological intentions that can be schematically represented as a mental movement and environmentally oriented personal development: from aesthetic to ethical ("Earth ethics"); from anthropocosmic ideas and comprehensions to ecophilic consciousness.

The formation of ecological discourse is a topical area of ecologization within which ecopoetics (Margrave, 2019) and geopoetics are important. The value of geopoetics is primarily in the formation of an intentionality that is directed to the Earth and its landscapes, as well as in the actualization of the earthly world, landscapes, and artifacts that are considered to have special aesthetic and ethical values. In this aspect, important is the work of Shabliy (2014), who reveals the aesthetic and ethical potential of the works of the Ukrainian classic Taras Shevchenko from a geopoetic perspective.

The tourism industry creates a certain pressure on ecosystems. This determines the ideas and experiences of ecologization of tourism as such that are of particular relevance in our time. In this aspect, the study of Xu et al. (2022) is important, which proposes to assess the greening of the tourism industry using the Driver-Pressure-State-Impact-Response model.

Let's look at some areas of greening related to religious traditions. Ecologically oriented ideas, values, and intentions are present in the doctrines and practices of world religions: Christianity, Judaism, Islam, Buddhism, Hinduism, Taoism, Confucianism, as well as in many polytheistic religious traditions. In this aspect, the relatively new field of ecotheology (Zuccaro, 2021), which is being developed in the Catholic and Protestant traditions, is relevant. It is important to study interreligious ecotheological practices aimed at maintaining the integrity of creation and environmental sustainability (Purnomo, 2022). The defining and systematic document is the encyclical of Pope Francis – "Laudato Si"' (Pihkala, 2018). This encyclical is dedicated to the preservation of the Earth for all living things. The direction of ecotherapy developed in the Christian tradition is practically oriented (Buzzell, 2020).

The above-mentioned multidirectionality and diversity of approaches and ways of ecologization, in fact, form an epistemological megasystem that permeates the vast majority of spheres of human activity. This points to the vital importance and necessity of transforming modern man into an Ecological Man, who can preserve and restore earth's ecosystems, ensuring the sustainable and co-evolutionary development of humanity and the Earth. The abovementioned ways of ecologization, despite their relative isolation from each other, can be applied and, accordingly, are already being used integrally, complementarily and interdependently. Among the abovementioned directions and ways of ecologization, the actualization of the cognitive, value-semantic and aesthetic potentials of art, architecture, as well as the application of a philosophical and ideological ecologically oriented understanding of reality, one of the significant variants of which is represented by the phenomenon of anthropocosmic consciousness, are particularly important. The above determines the methodological orientation and expediency of applying these paths integrally, as having internal deep conceptual, semantic and substantive connections. This idea of the integrative use of anthropocosmic consciousness, architecture and art for the ecologization of specialists and the educational process is not sufficiently represented in the scientific literature.

One of the culturally determined ways of methodological understanding of the phenomenology of anthropocosmic consciousness and the actualization of the possibilities of its purposeful disclosure and development is the ecological and value reflection of architecture, presented not only and not so much as a narrowly professional phenomenon, but, above all, as an anthropological cultural, socio-anthropological (Müllauer-Seichter, 2020), spatial (Drozdowicz, 2021), psychological, aesthetic, ecological phenomenon (Barber, 2020; Goldberger, 2011; Cole and Hamilton, 2020; Thampanichwat et al., 2023; Poon, 2020; Zhong et al., 2022). The cultural and social semiotics of architecture is important, in particular, as a component of the discourse of power (Jasz, 2021). Accordingly, we define as an urgent educational, pedagogical and environmental problem the need for purposeful application of epistemological-value, aesthetic-ethical, aesthetic-existential and interpretive potentials of the architectural tradition and architectural objects (buildings) for integrative ecologization and aestheticization of the educational process and competencies, including health-preserving A significant aspect of this problem is its development and practical application on the example of ecologization of the health-preserving competence of a physical education teacher in the conditions of postgraduate education. The abovementioned aspects of the use of architecture and art, the fate of the actualization of anthropocosmic consciousness, which is considered as a significant component and prerequisite for the ecologization of the cultural and educational space, are not sufficiently covered in the scientific literature. This, taking

into account the importance of ecologization as a way to achieve the goals of sustainable development, presents this research as relevant.

2 SELECTION OF METHODS AND DIAGNOSTICS

The paper *purpose* is to develop an architectural and artistic strategy of ecologization as a mental-spatial way of realizing the goals of sustainable development on the example of improving the health-preserving competence of a physical education teacher.

A system of methods and approaches was used in the study. The analysis of scientific literature and ecological, architectural, artistic, aesthetic, ethical, competence, health-preserving (Klochko et al., 2020a), systemic, anthropological, cultural, pedagogical, reflexive, hermeneutic, axiological, eco-ethical (Belardinelli and Pievani, 2023), epistemological, archetypal (Erazo Andrade et al., 2022), geopsychological, psychological, existential (Gosetti-Ferencei, 2022), ontological, transdisciplinary approaches and methods.

Concepts were applied: anthropocosmism (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022), sustainable development goals (Guerra et al., 2022), "Gaia" (Gaia hypothesis) (J. Lovelock) (Žukauskaitė, 2020), knowledge transfer (I. Nonaka) (Obembe and Obembe, 2020), existentials (L. Binswager), geopsychology (A. Mindel), ecological education and ecological pedagogy (Su and Zhao, 2023; Corpuz et al., 2022), care for the Earth (A. Gore Jr.) (Nickerson, 1992), the aesthetics of the surrounding environment (Brady and Prior, 2020; Slawsky et al., 2022), the idea of counteracting ecophobic tendencies of consciousness (Klochko et al., 2022), human qualities (A. Pecchei) (Facioni and Paura, 2022).

Own methodological developments. The author's own methodical concepts were used: "Architectural and artistic strategy of ecologization" (discussed in section "3. Results") and "Questionnaire Fedorets definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher."

This questionnaire was used to determine the effectiveness of the application of the "Architectural and artistic strategy of ecologization", which was used to ecologization the teacher's health-preserving competence.

"Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher":

1. What is the mental and psychological phenomenon that reflects the system, integrity, spatiality, harmony of human interaction with the world and its unity with the Earth, which is consciously or intuitively applied in the process of developing and building housing and/or in its arrangement and design in traditional cultures?

1.1. Innovativeness.
1.2. Anthropocosmism.
1.3. Critical thinking.
1.4. Emotional intelligence.

Correct answer: 1.2.

2. In the "Encyclical letter "Laudato Si'" of the Holy Father Francis: On care for our common home", the planet Earth is viewed from a spiritual perspective as:

2.1. Home-cosmos.
2.2. An inexhaustible resource.
2.3. The field of innovative activity.
2.4. System of industrial landscapes.

Correct answer: 2.1.

3. A person defines and reveals his existence as spatial by:

3.1. Buying a watch.
3.2. By purchasing a computer.
3.3. By purchasing and arranging a house (housing).
3.4. By buying shares.

Correct answer: 3.3.

4. In order to aestheticize and ecologize the educational process in the development and improvement of health and movement systems and technologies of physical culture, we can apply the ideas of the architectural and artistic style of the Baroque, among which the following are relevant:

4.1. Formality, informatization, activity, innovativeness, etc.
4.2. Lack of cosmicism and mundaneness, antiaestheticism, static, disharmony, "seriousness", lack of plasticity, fluidity, desacralization, lack of ethical contexts.
4.3. Cosmism, aestheticism, dynamics, harmony, playfulness, plasticity, fluidity, virtuosity, detail, sacredness, ethical and aesthetic semantic contexts, effects of both volatility ("ethereality") and eternity.
4.4. Philosophizing, digitalization, technology, gamification, virtualization, etc.

Correct answer: 4.3.

5. In order to aestheticize and ecologize the educational process in the development and improvement of health and movement systems and physical culture technologies, we can apply the ideas of the architectural and artistic style of organic modernism of Antonio Gaudi, among which the following are relevant:

5.1. Formality, regularity, symmetry.

5.2. Plasticity, playfulness, imitation of living nature (plants, animals, elements).

5.3. Imitation of technical systems, detailing, directness.

5.4. Informativeness, closedness and security of the system, technology.

Correct answer: 5.2.

We use the McNemar's test (Fay, 2020) for dichotomous data to confirm that the results of the questionnaire according to the diagnostic method "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" of the experimental group are significantly different from the results of the control group after the experiment. We also use it to reliably confirm that the control and experimental groups had equivalent test results before the start of the implementation of the "Architectural and artistic strategy of ecologization" strategy in the educational process.

The null and alternative hypotheses were formulated:

X_0: there is no difference between the test results of the control group and the experimental group;

X_1: there is a significant difference between the test results of the control group and the experimental group.

The R programming language was used in the Posit Cloud (Posit Software, PBC, 2022) environment to perform calculations according to McNemar's paired test.

3 RESULTS AND DISCUSSION

Let's consider this problem using ecological-anthropological, cultural, existential, anthropocosmic and pedagogical approaches. Methodologically understanding this problem can be singled out as a significant spatial aspect. This is due to the fact that ecology "works" with both spatial and living objects, and, above all, such a central megaobject is the Earth as a planet and as a living being (according to the concept of "Gaia" by (J. Lovelock) (Žukauskaitė, 2020; da Silva and Tsigaris, 2022). The above is the "methodological bridge" that reveals the organicity and appropriateness of the study of spatial objects, which are, first of all, architectural structures as ecological-anthropological and anthropocultural phenomena.

Internalization of the symbolism of "Earth-Cosmos" into the mental reality of a person. In archaic and traditional cultures, the relationship between man and the Earth was largely determined by religious, magical and partially mythologized secular traditions. One of the central and defining aspects of these traditions was a person's understanding of himself as a being that is an organic part of the cosmos (the world) (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022). The cosmos was presented as a "native" and eternal home, with dangers and risks as well as resources. In this way, we actualize the ancient idea of anthropocosmism (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022) as significant for modern ecologization processes.

It is clear that the boundless cosmos became a home in full when a part of it was isolated, demarcated and "alienated" in the process of man's creation of his own dwelling. In the process of building and "getting used" to a new house, a person modeled the eternal World (Earth Cosmos) in it again (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022). For example, in the dwellings of the vast majority of traditional cultures, the existence of a central pillar was typical, which symbolized the World Tree, the Cosmic Axis, and other archetypal ideas (Erazo Andrade et al., 2022). A hearth or a heating device (for example, a stove) had a special and, mostly, complex spatial symbolism. That is, in the dwelling itself, the World was recreated, "reborn" on a new high-quality everyday and everyday level. The Earthly World was created "anew", which, unlike the real world, was "cleansed" of the risks, challenges and threats from which man built his home and "hid" in it. That is, the real unpredictable world, which is actually both a system of threats and a "good" irreplaceable resource, was reproduced and "born" again. The world as a reality, "passing" through human consciousness and activity, was transformed into a "Good Cosmos", into the Garden of Eden precisely in the process of planning and creating housing (and/or its arrangement, design and existence in it). Passing through the specified cultural and activity transformations, the earthly reality, accordingly, became a "human", "soft", "warm" understandable, safe, predictable Anthropological Cosmos, such that was amenable to management. As the ancient Romans noted, – *Domussua cuigue est tutissimum refugium* (Latin) (One's

own home is a safe shelter for everyone). When creating a dwelling, a person projected, reproduced the external macrocosm ("big world") in the "Home cosmos" that protected his "microcosm".

An additional mental and psychological effect of building a home was the construction of one's inner human Microcosm. The human "I" acquired cosmic-spatial dimensions forming the inner world of a person as ordered, harmonious, plastic, dynamic, i.e. somewhat close to the Earth-Cosmos. In general, the above-described process, which from a psychological point of view is interiorization, i.e. "transferring the external reality inwards" into the human consciousness. External reality is transformed into semiotic-symbolic systems (first of all, language), images, algorithms, intentions, values, meanings. Interiorization forms the inner world of a person through the disclosure and reception of external reality as significant. This is done on the basis of certain cultural specifics. Aesthetic, ethical, behavioral features and connotations of culture and its unique "aura" thus become the property and component of the personality and all its spheres. That is, our inner cosmos is necessarily filled with a panorama of symbols and images of the culture in which we are formed and, accordingly, which is also ours, another cosmos. And, accordingly, the home-cosmos as a model of the World-Earth is one of the central ones that is interiorized. The consideration of the above-presented aspect of the internalization of natural reality – the Earth-Cosmos by actualizing the cultural dimension was carried out on the basis of anthropological ideas and the cultural-historical concept of the psyche.

Home is a system of harmonizing a person and his relationship with the Earth. The indicated process of formation of the inner cosmos of a person based on the reception of the house as a cosmos contributed to the harmonization of relations between man and the world. Accordingly, a person became, primo loco (first of all), a sophrosyne person (that is, a moderate, harmonious person) regardless of the type of temperament, character, attitudes and life goals. "Human-Sophrosyne" (sophrosyne, Ancient Greek: σωφροσυνη), who is moderate, harmonious, so that he has common sense and a clear mind, not clouded by ideologies, represents both the ancient and, to a large extent, the Ukrainian ideal. We consider a moderate person (harmonious, sophrosyune) as one who, first of all, has a harmonized relationship with the Earth-Cosmos, which, accordingly, is a psychological prerequisite for the realization of the goals of sustainable development. In such a "Human-Sophrosyne" the harmony of the external world, as well as the harmonious and harmonizing "essence of Gaia" (the world of the Earth) through internalization (the analysis is carried out in accordance with the cultural-historical theory of the psyche) is transformed into the harmony of the individual, and into the real existing "sustainable (harmonious) development" of the individual, cultures and social groups. As indicated, the reception and "unfolding" of harmony in the soul occurs through building one's home in the real world and, "in parallel", in the human mind. That is, "Home-cosmos" is our human way of harmonizing relations with ourselves and the World-Earth, corresponding to human nature.

Existential aspect of the problems of the house. A person is a being who has the ability to experience and live his existence (to be in it and to be it), that is, to exist. Our being is also "being with the Earth", which, in fact, "includes" the dimension of our existence. Earth as space, as reality, as being in us and with us. Accordingly, in order to clarify and expand the deep psychological meanings of the House, we interpret the presented visions of the earthly house-Cosmos from the standpoint of existential psychology in the system of fundamental concepts of which there are existentials (existentials are formally separated but, at the same time, significant fragments of our existence). Existentials of space, corporeality (it is understood also spatially, or more precisely spatio-temporally), time, etc. are distinguished. The specified existentials of space and time exist in the system of others, namely, together with the existentials of care and love (Heart), harmony, etc. Accordingly, we interpret the existential spatiality in the context of the manifestation "through them" not only of human, but also as the disclosure of the existence of the Earth as a planet and a living entity, as a unique landscape (remember those dear "our" landscapes that "live" in us and always with by us). Thus, our interpretation of the spatial-existential dimension includes earthly connotations, which is transformed into the phenomenology of existential space. Accordingly, time as such is in fact Earthly time, which without limits passes into our existential temporality. Thus, in the system of our inner being, both human and earthly dimensions merge and exist relatively separately in their spatial, temporal, and vital formats. That is, humans are anthropogeographic beings (we recall the idea of "anthropogeography" by Friedrich Ratzel). Therefore, even from a deeply intrinsic position, Home, Home-Earth are deeply rooted in our existence, or rather, they have always existed there.

The existential of the House or, as we understand it, the House-Earth and the existential of love and the existential of care, being in the same "plane", form one essential integrity. Thus, in the system of existen-

tially oriented understandings, Home and Earth are what is not only outside of us, but also what is inside us, in our being, and this is ourselves, this is our share.

Integrative understanding of the human home as an earthly anthropocosm in the context of ecologization and health preservation process. Summarizing, it can be noted that a person's home (Barber, 2020; Goldberger, 2011) is not only a "place of residence", but also a system formed on the basis of a special "anthropo-terrestrial integration and the formation of a special integrity" of phenomena of various nature: anthropological, social, mythological, existential, earthly, cosmic, symbolic, spiritual. Thus, the human home includes the Earth-Cosmos transformed both: 1) into the building itself and into – 2) a Semiotic-symbolic-figurative system, the sum of certain stereotypes, myths, scenarios of behavior, attitudes that collectively form the person himself and his inner world; 3) to culture; 4) into the human Umwelt (Klochko et al., 2020b), in which we distinguish the dimensions of House-Space-Earth and Earth-Space ("Great House"); 5) into the system of harmonizing relations: a person with himself (reflexive and harmonizing aspect), a person and the Earth as a Great House (Cosmos), between people in society; 6) the projection of harmonious interactions into the future and the past – a culturally determined harmonious attitude to the future as the future of Earth and human, that is, compatible, co-evolutionary. The methodological and worldview interpretations and understanding of the house as a special earthly anthropocosm, which not only "surrounds" but also forms a person and which is simultaneously significant in his mental reality, represents architecture (Barber, 2020; Goldberger, 2011; Manurung et al., 2022; Müllauer-Seichter, 2020; Drozdowicz, 2021; Cole and Hamilton, 2020; Thampanichwat et al., 2023; Poon, 2020; Zhong et al., 2022; Jasz, 2021) as a special anthropological-spatial sphere and as art. Accordingly, the ecological value reflection of the architectural tradition can be purposefully applied for: ecologization of education; development and preservation of health; the formation of a developed moderate person – Homo Ecologicus (Latin), in which ecophilic tendencies of consciousness are present; transformation of crops into ecophiles.

For the purpose of environmentalization of education, which includes environmentalization of the health-preserving competence of the physical education teacher, as well as for the development and preservation of psychological and spiritual health in the educational process, we use presentations of architectural structures and ecologically and health-preserving oriented narratives (stories) about them. Accordingly, environmentalization, which is implemented by actualizing knowledge of architecture, is carried out in relation to the aestheticization of the educational process. For this, presentations of works of art and architecture are used. Images of architectural structures are also included in our "Epistrophe of the Earth" (Yevtuch et al., 2021b) technique. "Architecture as frozen music", according to the definition of Le Corbusier, which carries the boundless spirit and the majestic eternal image of Gaia-Mother (Mother-Earth), is aimed at revealing the manifestation of human nature in the form of kindness directed to its earthly essence and to the Earth itself. That is, we are talking about the Epistrophe of the Earth (Yevtuch et al., 2021b) as an eternal descent to the Earth as a great soul and a living being, which, first of all, must take place in the souls of people. This is the spiritual revolution that Aurelio Peccei spoke about (Facioni and Paura, 2022). On the basis of an ecological and valuable understanding of anthropocosmic ideas, architectural and artistic traditions, we are forming the "Architectural and Artistic Strategy of ecologization" as one of the defining trends in the development of ecophilic consciousness.

An important source of aestheticization, ecologization, and axiologisation in education, implemented integratively, is the application of knowledge about certain architectural and artistic styles and traditions. Ecological and anthropological, value and aesthetic analysis of relevant author's styles and unique works of certain creators is also significant. In this ecologically oriented pedagogical system, we turn to the disclosure of the ecological, creative, axiological, aesthetic, ethical, anthropological, cultural, harmonizing potentials of such styles as baroque, Ukrainian baroque, Ukrainian folk architecture, eco-architecture, eco-design, as well as the work of the classics of Antonio Gaudi, etc. We will briefly present the indicated areas

Ecological and valuable reflection of architecture and baroque style. Baroque is not only an architectural style or an aesthetic system. Baroque is a wider and deeper socio-cultural and artistic phenomenon (Jasz, 2021). It can be considered as a special worldview, a special culture, a specific style of thinking, reflection, interpretation, etc. Baroque as a style extends to all art and life. We can also talk about the phenomenon of the "Baroque Human", who is refined, kind, playful, creative, aesthetic, humane, free, intelligent, capable of rising to his spiritual heights. Ukrainian national character, as well as Ukrainian culture and architecture, in their essence, are baroque or can be represented in baroque symbols and images. This luxurious style, which reflects the greatness of

the cosmos, its diversity with "surplus", is close to Ukrainians (Cherkes et al., 2020). Accordingly, at one time Ukraine actively prescribed and developed it. This style was initiated by G. L. Bernini (1598–1680) and developed by the classics of the Renaissance.

This style is interesting in that it probably most fully reflects the idea of a harmonious, balanced, majestic and, at the same time, dynamic, plastic, fluid, playful and living Cosmos (World), filled with Spirit and Light. In Baroque, there is an attempt to depict the diversity and richness of the world, the greatness of the Earth, the elements, and the forces of nature (figure 1). It reflects the spirit of diversity and effectively synthesizes architecture and art. In fact, the baroque represents an attempt in art to "recreate" the worlds created by God, including the earthly and heavenly. At one time, this style was officially recognized by the Catholic Church as one that corresponds to the ideas and values of Christianity and reflects the majestic "shining" world structure, its hierarchy, the music of the spheres, the majesty of the Creator.

Figure 1: Trevi Fountain (ital. Fontana di Trevi) in baroque style (photo taken by the author).

The construction of buildings in this style required significant material resources and artists with a high level of training and real talents. It is clear that it is cheap and simply impossible to model a complex majestic world. In this style, there is a play of forms, a play of light, and essentially virtual worlds are created. It is luxurious, multidimensional, multifaceted, polysemantic, polyontological, exquisite and harmonious.

In the context of ecologization (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022; Barber, 2020) this style is relevant for the aesthetic and valuable understanding of the planet Earth, its landscapes, and biodiversity. It, perhaps not the best, reflects the unity, dynamic interaction and co-evolution of the earthly, human, and divine. Despite the often massive and large volume of buildings in this style, the size of the building is not as significant as in other areas of architecture. What is important is the luxurious internal and external representation of the world formed by the Creator. This style, in fact, models the "living" space of the earth, landscapes and its earthly and heavenly Cosmos-world (Kultaieva et al., 2021; Kultaieva and Panchenko, 2022; Barber, 2020). Baroque is imbued with optimism, vitality, ethereality, playfulness, perspective, harmony.

Ukrainian folk architecture as a representation of ecological culture and ecophility of the people and its anthropocosmism. Ukrainian folk architecture reflects the indomitable and, at the same time, balanced, cheerful and active nature of the people, its dynamism, contemplativeness, emotionality, unity with landscapes, sense of measure and harmony (Cherkes et al., 2020). The Ukrainian house, regardless of the region and the material, which is mainly clay or wood, is a special earthly cosmos in which, on a symbolic level, the spiritual worlds and heavens are represented. In the Ukrainian house, various materials were uniquely and harmoniously combined, which created a special harmony and peace. The house was originally formed as one that organically integrated into the landscape, taking into account the occurrence of underground water and ideas and practical understandings about favorable and not unfavorable places for construction. The idea of purity manifested in white color was relevant. The hut was traditionally whitewashed twice a year and thus renewed and enlivened. The bright design, in which the cosmogony and stylized flora and fauna are reflected, gave a special representative, expressive color to the dwelling, emphasizing the liveliness, playfulness, dynamism of the whole world "in miniature". The house is filled with human spirit, warmth, life and goodness thanks to the use of towels, carpets, paintings, and dishes. At the same time, there was a spirit of measure and harmony in everything. Ukrainians, namely folk craftsmen, experimented a lot with form and materials.

Both earthly and heavenly Cosmos and Spirit are fully reflected in the folk sacral architecture, which, according to its spirit, "gravitates" towards the baroque in its plasticity, expressiveness, sophistication, as in the Ukrainian house. Modeling flowing

spaces filled with "light-spirit" is relevant.

Antonio Gaudi's organic modernism as a manifestation of "ecological spirituality", ecological aesthetics and the Spirit of Gaia. The work of the outstanding Spanish architect Antonio Gaudi (figure 2) (Avilés, 2021; Ramzy, 2022), who was canonized by the Catholic Church as a saint, we are primarily interested in the unique potential of anthropocosmism, sophistication, spirituality and aestheticism.

The architect said that he continued the Gothic tradition. He was one of the first to use organic forms in architectural creativity. The indicated use of organic forms was not only copying, it was, first of all, conceptualization, stylization, transformation, the result of which was an attempt to understand and represent the essence of the idea, the value and meaning of the "source phenomenon" (for example, a flower), on the basis of which the architectural form was developed.

The work of the American architect Frank Lloyd Wright (Vaughan and Ostwald, 2022) is relevant for understanding the unity of the human dwelling and the Earth and, accordingly, Human and Gaia.

His unique "Fallingwater" in Pennsylvania shows the "flow" and "interaction" of land forms, landscape and spaces of the house. In fact, it is a "game" of two worlds – the earthly world and the world of a person's home (figure 3). Concluding the consideration of the "Architectural and Artistic Strategy of ecologization", we recall the ancient wisdom expressed by Cicero – Nullus est locus domestica sede jucundior (Latin) (There is no place nicer than the native home).

3.1 Experimental study

To determine the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher in the educational process of professional development in the conditions of postgraduate education, the "Architectural and artistic strategy of ecologization" technique was applied. The analysis of training results was carried out with the help of the "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" (see section "Selection of methods and diagnostics").

816 physical education teachers took part in the study, of which 411 were in the experimental group, and 405 were in the control group, the research was conducted in 2017–2021. The experimental study was conducted in Ukraine in 9 institutions of higher education: Zhytomyr Regional Institute of Postgraduate Pedagogical Education, Drohobych State Pedagogical University of Ivan Franko, Zaporizhzhia Regional Institute of Continuing Pedagogical Education, Chernihiv Regional Postgraduate Institute of Postgraduate Pedagogical Education named after K. D. Ushinsky, Mykolaiv Regional Institute of Postgraduate Pedagogical Education, Donetsk Regional Institute of Postgraduate Teacher Education, Kherson Academy of Continuing Education, Sumy Regional Institute of Postgraduate Pedagogical Education, Lviv Regional Institute of Postgraduate Pedagogical Education.

As a result of the questionnaire aimed at determining the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher, the following results were obtained: the number of correct answers of the teachers of the control group before the experiment is 43% (figure 4), and after the experiment – 47% (figure 5); the number of correct answers of the teachers of the experimental group before the experiment was 46% (figure 6) and after the experiment – 93% (figure 7).

We will use McNemar's test to confirm that before the start of the implementation of the "Architectural and artistic strategy of ecologization" strategy in the educational process, the results of the questionnaire according to the diagnostic method "The Fedorets Questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" of the control group were not differ significantly to the results of the experimental group. For this purpose, in the Posit Cloud environment, we will use the *mcnemar.test()* function to calculate McNemar's test statistics for the data of the control and experimental groups.

In the process of checking the test results of the control group and the experimental group before the start of the implementation of the "Architectural and artistic strategy of ecologization" strategy in the educational process, was obtained the McNemar's test statistic:

```
  McNemar's Chi-squared test
chi-squared=1.0309,
df=1,
p-value=0.3099.
```

Consequently, the calculated value of χ^2=1.0309 is less than the theoretical value of χ_t^2=3.8 at the level of significance a=0.05 ($\chi^2 \leq \chi_t^2$), and the p-value is greater than 0.05 at the level of significance a=0.05 (p>0.05). Therefore, we accept the hypothesis X_0 that there is no difference between the test results of the control group and the experimental group.

In the process of checking the test results of the

Figure 2: Plant-shaped columns in the temple “Sagrada Familia” (”Holy Family”) in Barcelona (Spain) (Sagrada Família, 2023), architect Antonio Gaudí.

Figure 3: Kaufman’s residence “Fallingwater” – a house designed in 1935 by the famous American architect Frank Lloyd Wright (1867–1959) (Fallingwater, 2023).

control group and the experimental group after the implementation of the “Architectural and artistic strategy of ecologization” strategy in the educational process, was obtained the McNemar’s test statistic:

```
    McNemar's Chi-squared test
chi-squared=28.167,
df=1,
p-value=1.113e-07.
```

Consequently, the calculated value of χ^2=28.167 is greater than the theoretical value of χ^2_t=3.8 at the level of significance a=0.05 ($\chi^2 > \chi^2_t$), and the p-value is less than 0.05 (p<0.05). Therefore, we reject the hypothesis X_0 and accept the hypothesis X_1 that there is a significant difference between the test results of

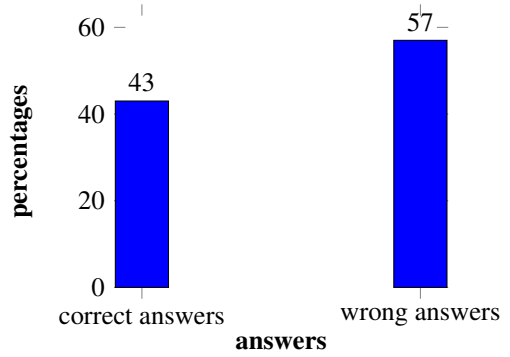


Figure 4: The results of a questionnaire aimed at determining the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher in the control group (the diagnostic technique "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" was used), before the experiment.

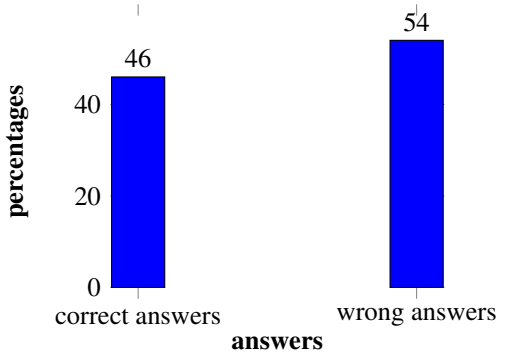


Figure 6: The results of a questionnaire aimed at determining the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher in the experimental group (the diagnostic technique "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" was applied), before the experiment.

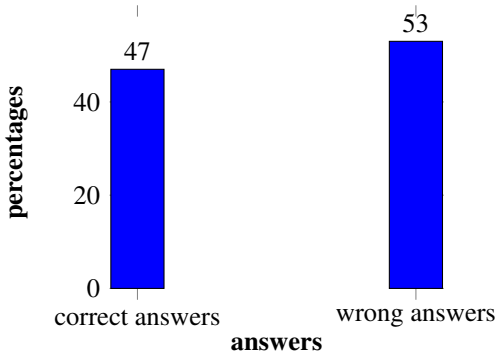


Figure 5: The results of a questionnaire aimed at determining the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher in the control group (the diagnostic technique "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" was used), after the experiment.

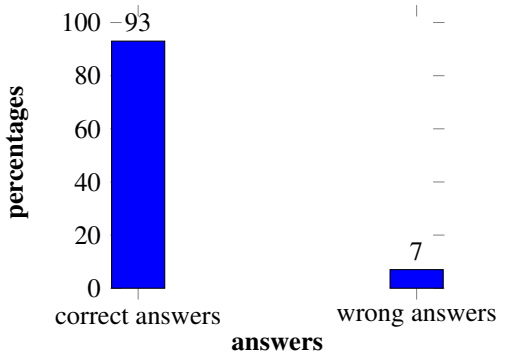


Figure 7: The results of a questionnaire aimed at determining the dynamics of the actualization of anthropocosmic consciousness as a significant component of the ecologization of the health-preserving competence of the physical education teacher in the experimental group (the diagnostic technique "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher" was applied), after the experiment.

the control group and the experimental group.

Thus, the positive dynamics of the results of the implementation of the "Architectural and artistic strategy of ecologization" strategy in the educational process as a component of the ecologization of the health-preserving competence of the physical education teacher have been determined.

Conceptually and methodologically, this study is formed within the framework of the paradigm of ecological pedagogy (Onopriienko et al., 2021; Yevtuch et al., 2021b), which includes a value reflection on the ideas of phenomenological ecology (Bonnett, 2019) and the ecologization of educational philosophy (Affifi et al., 2017). In contrast to the above authors, the format of ecologization developed by us includes the active and integrative use of existential, psychological, aesthetic, anthropological, systemic, artistic approaches, as well as the use of anthropological, value and methodological potentials of the ancient Greek cultural and educational system of paideia (ancient Greek παιδεια) (Yevtuch et al., 2021b). The socio-cultural and psychological orientation of our approaches to greening is the application of the ideas of ecophilic and ecophobic orientation of consciousness (Klochko et al., 2022). The mainstream way of ecologization in this pedagogical system is the use of

architecture as a spatial phenomenon integrally with the use of fine arts (viewing reproductions of paintings), which is presented as an artistic way of comprehending the greatness and harmony of the world and actualizing anthropocosmic consciousness. The choice of these spatially oriented approaches is due to the "spatial" specificity of pedagogical influences on physical education teacher, which are consistent with motor activity, which is the basis of the professional activity of these specialists. It is clear that motor activity also has a distinct spatial dimension. In our pedagogical practices of ecologization, we also use ecopoetics (Margrave, 2019) and geopoetics (Shabliy, 2014), as well as ecologically oriented narratives.

This study is based on the methodological basis of previous research and, in fact, is their further development and practical implementation. The methodology integrally applied a system of approaches, among which the most important were competence-based health, anthropological, geopsychological, ethical, psychological, and existential. The concepts of "Caring for the Earth" (Gore, 2000), noosphere, "Gaia" (Lovelock, 2010) were also applied, as well as the cognitive and ethical and value potential of the ancient Greek cultural and educational system of paideia (ancient Greek παιδεια) (Yevtuch et al., 2021b). The concepts aimed at ecologization and, accordingly, the development of an ecophilic person of the future – Homo Ekologicus – were developed. These ecological concepts, which are tellus (in the sense of the Earth) and anthropologically oriented, in their totality represent a special "eco-cognitive-ethical-value" system: "Tellus-Anthropic Convergence", "Good of the Dialogue of Man and Earth", "Arete of Earth", "Compliance with Active Impact on Earth", "Tellus-Anthropic Harmonization", "Earth Epistrophe" (Yevtuch et al., 2021b).

The concepts of "Tellus-Anthropic Convergence" and "Good of the Dialogue of Man and Earth" are considered as methodological intentions and practical attitudes that reflect the idea of the need for close coevolutionary and dialogical interaction between man and humanity with the Earth, including the restoration of a value-based and careful attitude towards the planet as an integral ecosystem and individual ecosystems. The concept of "Arete of Earth" presents the idea of developing human ecophilicity, which is considered as a charity – arete (ancient Greek αρετη – charity, benefits, virtue). The concept of "Tellus-Anthropic Harmonization" clarifies and specifies the interaction in the Human-Earth system as one that should be formed on the basis of harmony, which is accordingly projected onto the personality itself. Accordingly, it is recommended to develop the Hellenistic phenomenon of sophrosyne (ancient Greek σωφροσυνη – prudence, discretion, common sense, moderation, "pure mind"), which is a system of behavioral stereotypes and a set of cognitive and characteristic features that generally determine harmonious, balanced, reasonable human behavior. In an ecologically oriented interpretation, we consider Sophrosyne as the behavioral and characterological basis of Homo Ecologicus. We have conducted research on ecophilic and ecophobic tendencies of consciousness (Klochko et al., 2022) as mental and behavioral characteristics that integrally reflect the orientation of the individual and his or her ecological orientation and the presence of biophilia. The methodological ideas used in the study of ecophobic tendencies of consciousness were also applied in the study of the architectural and artistic strategy of ecologization as a mental-spatial way of realizing the sustainable development goals.

4 CONCLUSION

Based on the integrative and ecologically oriented use of the ideas of anthropocosmism, the concept of sustainable development and the traditions of architecture and art, the "Architectural and artistic strategy of ecologization" was formed, which is a method of ecologization and aestheticization of the cultural and educational space and competencies. The application of the specified methodology is given on the example of environmentalization and aestheticization of the health-preserving competence of a physical education teacher in the conditions of postgraduate education. Making it more specific, we note that this technique is primarily aimed at improving the anthropocultural component of the specified competence. The peculiarity of the anthropocultural component of the health-preserving competence of a physical education teacher is that in his meaningful and value-semantic systems, ecological and anthropocultural (including aesthetic, motor, etc.) problems are considered as central, system-organizing, complementary, harmonizing. That is, within the framework of the anthropocultural component, the unity of Man and the Earth existing in ecophilic archaic and traditional cultures is restored through the actualization of anthropocosmic consciousness. Accordingly, an ecologically oriented understanding of culture is actualized and developed: as an ecophilic human environment, as an ecologically acceptable way of being, as a harmonious existence based on the deployment of the concept of sustainable development. "Architectural and artistic strategy of ecologization" is aimed at realizing the goals of sustainable development. First of all, this

strategy contributes to the implementation of "Goal 3. Good health and well-being", "Goal 4. Quality education" and "Goal 11. Sustainable cities and communities".

Anthropocosmic consciousness includes a systematic and holistic perception of the world as a home, and the interpretation of the home as a projection of the earthly Cosmos. Accordingly, the presence of anthropocosmic consciousness in a person is considered as a personal-psychological and socio-cultural prerequisite for the effective environmentalization of the cultural and educational space, competencies (in this study, health-preserving competence) and the socio-cultural sphere as a whole. The architectural tradition is the direction in the system of founding ideas that has anthropocosmic aspects. In many cases, the architect develops a housing project as a model of space, which is ordered, harmonious, aestheticized. The same construction of housing based on anthropocosmic intentions and ideas about the home as a small cosmos was carried out in archaic and traditional cultures. We consider anthropocosm as such a phenomenon that is inherent in human nature as well as in the vast majority of cultures. Therefore, it is important to actualize it as a significant psychological and cultural component of environmentalization. Accordingly, through familiarization with architecture as an art that creates a second "architectural reality", a "new cosmos" for man, opportunities are revealed for the actualization of both the potentials of anthropocosmism and aesthetics, which we consider as psychological and anthropocultural prerequisites and foundations of environmentalization.

"Architectural and artistic strategy of ecologization" includes an introduction to some architectural and artistic styles and reproductions and videos of significant architectural works (buildings, interiors, parks, etc.). In the process of greening the health-preserving competence of the physical education teacher, the issue of reception of ideas significant for certain architectural and artistic styles, which can be applied to organize the motor activity of students and preserve their health, is considered.

For example, the idea of harmony, as one of the determining factors in the existence of the world and man, and which is the basis of both the baroque style and the trend of sustainable development, can be applied to improve the organization of motor activity, preserve health, and improve the educational process in as a whole The idea of harmony traditionally includes: the concept of measure in relation to the purpose of physical exertion; actualization of beauty, grace and plasticity in motor actions; determines refined, humane, delicate high relations and specifics of communication of participants in the educational process, etc. Pedagogical and valuable reflection of exquisite architectural works enables the teacher of physical culture not only to understand but also to feel harmony as embodied in real architectural objects and objectified ideas, as an aesthetic spatial phenomenon, and not only to consider harmony as a formal abstract concept. Baroque, as an anthropocosmic and theocosmic style in its essence, is characterized by harmony not only and not so much as statics, but as dynamics, which, accordingly, can be applied in the organization of motor activity. Such aspects as friskiness, the ability to create spatial illusions, carnival elements, refinement, aristocracy are of particular interest for the transformation of baroque ideas into the educational process. The baroque interpretation of health is existentially oriented, namely as the fullness and harmony of life, its friskiness, fullness of events, multidimensionality, activity, self-realization, existence as Homo Estetikus. Thus, on the example of the application of the baroque architectural and artistic style for environmentalization and aestheticization, operationalization (transformation of theoretical provisions into practice and technology) and transfer (in the sense of reception, transfer, adaptation, concretization) of ideas, values, meanings, images, contents of the specified style in educational practices of health preservation and organization of motor activity.

The analysis of the results of the training of physical education teachers in the conditions of postgraduate education using the "Architectural and artistic strategy of ecologization" was carried out using the "Fedorets questionnaire for the definition and actualization of ecologically oriented anthropocosmic ideas, values and intentions of the teacher". In the experimental group, a positive dynamic of educational results is observed. In this group, there is an increase in positive responses by 47% (before the experiment it was 46%, after it became 93%). In the control group, the dynamics is insignificant – 4% (before the experiment it was – 43%, after it became – 47%).

Using the example of "Architectural and artistic strategy of ecologization", we represent a humanistically oriented idea of soft ecologization. The essence of soft ecologization consists in the primary and dominant application of humanitarian (psychological, social, pedagogical) methodologies, techniques and technologies as system-organizing and determining factors in the development of environmental consciousness and in the formation of the person of the future – Homo Ekologicus. That is, not so much legal and administrative and other (hard) influences should be leading and determining, but a system of soft, humane, human-centered influences. Soft ecologization

is aimed, first of all, at the formation of ecophilic human qualities (according to Peccei (1977)) on the basis of revealing the best manifestations of human nature (aestheticism, kindness, mercy, biophilia) and by actualizing internal motivation, and not through the threat of punishments and restrictions.

REFERENCES

Affifi, R., Blenkinsop, S., Humphreys, C., and Joldersma, C. W. (2017). Introduction to Ecologizing Philosophy of Education. *Studies in Philosophy and Education*, 36(3):229–241. https://doi.org/10.1007/s11217-017-9574-3.

Ahad, M. A., Paiva, S., Tripathi, G., and Feroz, N. (2020). Enabling technologies and sustainable smart cities. *Sustainable Cities and Society*, 61:102301. https://doi.org/10.1016/j.scs.2020.102301.

Ashby, W. R. (1968). Variety, Constraint, and the Law of Requisite Variety. In Buckley, W., editor, *Systems Research for Behavioral Science*. Routledge, New York.

Avilés, P. (2021). Nikolaus Pevsner, Photography, and the Architecture of Antoni Gaudí. *Getty Research Journal*, 14:123–150. https://doi.org/10.1086/716583.

Barber, D. A. (2020). *Modern Architecture and Climate: Design before Air Conditioning*. Princeton University Press.

Barbiero, G. and Berto, R. (2018). From Biophilia to Naturalist Intelligence Passing Through Perceived Restorativeness and Connection to Nature. *Annals of Reviews and Research*, 3(1):555604. https://juniperpublishers.com/arr/pdf/ARR.MS.ID.555604.pdf.

Belardinelli, S. and Pievani, T. (2023). The Ethics of Gaia: Geoethics From an Evolutionary Perspective. In Di Capua, G. and Oosterbeek, L., editors, *Bridges to Global Ethics: Geoethics at the Confluence of Humanities and Sciences*, pages 55–72. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-031-22223-8_5.

Bonnett, M. (2019). Towards an ecologization of education. *The Journal of Environmental Education*, 50(4-6):251–258. https://doi.org/10.1080/00958964.2019.1687409.

Bonnett, M. (2021). *Environmental Consciousness, Nature and the Philosophy of Education: Ecologizing Education*. Routledge.

Brady, E. and Prior, J. (2020). Environmental aesthetics: A synthetic review. *People and Nature*, 2(2):254–266. https://doi.org/10.1002/pan3.10089.

Buzzell, L. (2020). Ecotherapy. In Leeming, D. A., editor, *Encyclopedia of Psychology and Religion*, pages 739–741. Springer, Cham, 3 edition. https://doi.org/10.1007/978-3-030-24348-7_9155.

Cherkes, B., Diachok, O., Panfilova, O., and Tarasiuk, I. (2020). Correlation of Sacred Architecture and Painting in Western Ukraine. *IOP Conference Series: Materials Science and Engineering*, 960(2):022109. https://doi.org/10.1088/1757-899X/960/2/022109.

Cole, L. B. and Hamilton, E. M. (2020). Can a Green School Building Teach? A Pre- and Post-Occupancy Evaluation of a Teaching Green School Building. *Environment and Behavior*, 52(10):1047–1078. https://doi.org/10.1177/0013916518825283.

Corpuz, A. M., San Andres, T. C., and Lagasca, J. M. (2022). Integration of environmental education (EE) in teacher education programs: Toward sustainable curriculum greening. *Problems of Education in the 21st Century*, 80(1):119–143. https://doi.org/10.33225/pec/22.80.119.

da Silva, J. A. T. and Tsigaris, P. (2022). The relevance of James Lovelock's research and philosophy to environmental science and academia. *Frontiers of Environmental Science & Engineering*, 17(3):39. https://doi.org/10.1007/s11783-023-1639-7.

Drozdowicz, P. P. (2021). Image spaces. Digital visual media in the context of baroque mural painting in architecture. *Images. The International Journal of European Film, Performing Arts and Audiovisual Communication*, 29(38):249–254. https://doi.org/10.14746/i.2021.38.15.

Erazo Andrade, S. P., Masunah, J., and Milyartini, R. (2022). Art Creation Using Active Imagination To Express Collective Unconsciousness. In *Proceedings of the 26th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2022)*, volume 3, pages 1–5. https://doi.org/10.54808/WMSCI2022.03.1.

Facioni, C. and Paura, R. (2022). Re-discovering Aurelio Peccei's contribution to Futures Studies. *European Journal of Futures Research*, 10(1):9. https://doi.org/10.1186/s40309-022-00193-8.

Fallingwater (2023). About Frank Lloyd Wright's Fallingwater - Architectural Masterpiece. https://fallingwater.org/about/.

Fay, M. P. (2020). Exact McNemar's Test and Matching Confidence Intervals.

Fromm, E. (1956). *The Art of Loving*. Harpers & Row, New York. https://ia800201.us.archive.org/30/items/TheArtOfLoving/43799393-The-Art-of-Loving-Erich-Fromm_text.pdf.

Gautier, A. M. O. (2016). Acoustic Multinaturalism, the Value of Nature, and the Nature of Music in Ecomusicology. *boundary 2*, 43(1):107–141. https://doi.org/10.1215/01903659-3340661.

Goldberger, P. (2011). *Why Architecture Matters*. Why X Matters Series. Yale University Press.

Gore, A. (2000). *Earth in the Balance: Ecology and the Human Spirit*. Houghton Mifflin Company, Boston.

Gosetti-Ferencei, J. (2022). Towards an Existentialist Ecology. *MLN*, 137(5):892–916. https://doi.org/10.1353/mln.2022.0067.

Guerra, J. B. S. O. A., Hoffmann, M., Bianchet, R. T., Medeiros, P., Provin, A. P., and Iunskovski, R. (2022). Sustainable development goals and ethics: building "the future we want". *Environment, Development and Sustainability*, 24(7):9407–9428. https://doi.org/10.1007/s10668-021-01831-0.

Jasz, B. (2021). Symmetry as the symbol of power in architecture: the Baroque and its heritage. *Symmetry: Culture and Science*, 32(3):421–430. https://doi.org/10.26830/symmetry_2021_3_421.

Joldersma, C. W. (2017). Earth Juts into World: An Earth Ethics for Ecologizing Philosophy of Education. *Educational Theory*, 67(4):399–415. https://doi.org/10.1111/edth.12257.

Klochko, O., Fedorets, V., Maliar, O., and Hnatuyk, V. (2020a). The use of digital models of hemodynamics for the development of the 21st century skills as a components of healthcare competence of the physical education teacher. *E3S Web of Conferences*, 166:10033. https://doi.org/10.1051/e3sconf/202016610033.

Klochko, O., Fedorets, V., Mudrak, O., Troitska, T., and Kaplinskyi, V. (2022). Modeling of ecophobic tendencies of consciousness of higher education students. *SHS Web of Conferences*, 142:03006. https://doi.org/10.1051/shsconf/202214203006.

Klochko, O. V., Fedorets, V. M., Uchitel, A. D., and Hnatyuk, V. V. (2020b). Methodological aspects of using augmented reality for improvement of the health preserving competence of a Physical Education teacher. In Burov, O. Y. and Kiv, A. E., editors, *Proceedings of the 3rd International Workshop on Augmented Reality in Education, Kryvyi Rih, Ukraine, May 13, 2020*, volume 2731 of *CEUR Workshop Proceedings*, pages 108–128. CEUR-WS.org. https://ceur-ws.org/Vol-2731/paper05.pdf.

Kultaieva, M., Radionova, N., and Panchenko, L. (2021). Cosmological and Cultural-Anthropological Turns in the Christian Philosophical Theology: Educational Implications in the Post-secular Contexts. *Philosophy and Cosmology*, 26:90–99. http://doi.org/10.29202/phil-cosm/26/7.

Kultaieva, M. D. and Panchenko, L. M. (2022). Miracle as a Message: Cosmological, Anthropological and Educational Implications. *Anthropological Measurements of Philosophical Research*, (22):26–35. https://www.researchgate.net/publication/367305554.

Lobo, C. (2022). The limits of the mathematization of the living and the idea of formal morphology of the living world following husserlian phenomenology. *Theory in Biosciences*, 141:175–202. https://doi.org/10.1007/s12064-021-00348-4.

Lovelock, J. (2010). *The Vanishing Face of Gaia: A Final Warning*. Basic Books.

Lu, Y. and Jover, G. (2019). An anthropocosmic view: what Confucian traditions can teach us about the past and future of Chinese higher education. *Higher Education*, 77(3):423–436. https://doi.org/10.1007/s10734-018-0280-z.

Manurung, P., Sastrosasmito, S., and Pramitasari, D. (2022). How to Reveal the Meaning of Space in Vernacular Architecture? *International Journal of Built Environment and Sustainability*, 9(1):89–97. https://doi.org/10.11113/ijbes.v9.n1.890.

Margrave, C. (2019). An Ecopoetics of Madagascar: Drawing Attention to Landscape Violence Through the Hybridity of Poetic Form and Language.

Marselle, M. R., Hartig, T., Cox, D. T. C., de Bell, S., Knapp, S., Lindley, S., Triguero-Mas, M., Böhning-Gaese, K., Braubach, M., Cook, P. A., de Vries, S., Heintz-Buschart, A., Hofmann, M., Irvine, K. N., Kabisch, N., Kolek, F., Kraemer, R., Markevych, I., Martens, D., Müller, R., Nieuwenhuijsen, M., Potts, J. M., Stadler, J., Walton, S., Warber, S. L., and Bonn, A. (2021). Pathways linking biodiversity to human health: A conceptual framework. *Environment International*, 150:106420. https://doi.org/10.1016/j.envint.2021.106420.

Matsunobu, K. (2017). Ecomusicality: An ecological pedagogy of music. In *11th Asia-Pacific Symposium for Music Education Research: Music Education Transcending Borders - The Historical City of Melaka, Melaka, Malaysia*. https://www.academia.edu/37145468.

Müllauer-Seichter, W. (2020). Synergies Between Social Anthropology and Architecture. Analysing Urban Green and Public Spaces. *Uni-Pluri/Versidad*, 20(2):1–24.

Nickerson, R. S. (1992). *Looking Ahead: Human Factors Challenges in A Changing World*. CRC Press.

Obembe, F. and Obembe, D. (2020). Deep learning and tacit knowledge transfer: An exploratory study. In Garcia-Perez, A. and Simkin, L., editors, *21st European Conference on Knowledge Management (ECKM 2020)*, volume 1, pages 556–575, Sonning Common. Academic Conferences International Limited, Academic Conferences and Publishing International Ltd.

Onopriienko, K., Onopriienko, V., Petrushenko, Y., and Onopriienko, I. (2021). Environmental education for youth and adults: A bibliometric analysis of research. *E3S Web of Conferences*, 234:00002. https://doi.org/10.1051/e3sconf/202123400002.

Peccei, A. (1977). *The Human Quality*. Pergamon. https://doi.org/10.1016/C2009-0-10950-9.

Pihkala, P. P. (2018). "Laudato Si"' in the Context of Ecumenical Ecotheology. In Heller, D. and Hietamäki, M., editors, *Just Do It? Recognition and Reception in Ecumenical Relations : Proceedings of the 19th Academic Consultation of the Societas Oecumenica*, volume 117 of *Beihefte zur Ökumenischen Rundschau*, pages 381–390. Evangelische Verlagsanstalt GmbH.

Poon, S. (2020). Deconstructing Sustainability Perceptions: Investigating Technological Innovation-Environmental Interaction in Green Buildings and the Influence of Architectural Design. *International Journal of Built Environment and Sustainability*, 8(1):91–101. https://doi.org/10.11113/ijbes.v8.n1.621.

Porri, F., McConnachie, B., van der Walt, K.-A., Wynberg, R., and Pattrick, P. (2023). Eco-creative nature-based solutions to transform urban coastlines, local coastal communities and enhance biodiversity through the lens of scientific and Indigenous knowledge. *Cambridge Prisms: Coastal Futures*, 1:e17. https://doi.org/10.1017/cft.2022.10.

Posit Software, PBC (2022). Posit Cloud.

Prigogine, I. and Stengers, I. (1984). *Order out of chaos: Man's new dialogue with nature*. Bantam Books.

https://deterritorialinvestigations.files.wordpress.com/2015/03/ilya_prigogine_isabelle_stengers_alvin_tofflerbookfi-org.pdf.

Purnomo, A. B. (2022). The Urgency of Interreligious Ecotheological Praxis to Protect the Earth and the Vulnerable. *Dialogo*, 9(1):61–73. https://doi.org/10.51917/dialogo.2022.9.1.4.

Ramzy, N. S. (2022). Beyond Sustainability, Design for Well-Being: Gaudí's Monument to Nature, Biomimetic Functions with Biophilic Morphology. *Journal of Architectural Engineering*, 28(1):05021016. 10.1061/(ASCE)AE.1943-5568.0000515.

Rodríguez-Labajos, B. and Ray, I. (2021). Six avenues for engendering creative environmentalism. *Global Environmental Change*, 68:102269. https://doi.org/10.1016/j.gloenvcha.2021.102269.

Sagrada Família (2023). Bosc de columnes de troncs i branques inclinades [Forest of columns of trunks and leaning branches]. Galeria d'imatges. https://sagradafamilia.org/galeria-fotografica.

Shabliy, O. (2014). To the base of geopoetics (based on the texts of Taras Shevchenko). *Human Geography Journal*, 17(2):10–17. https://periodicals.karazin.ua/socecongeo/article/view/361.

Slawsky, E. D., Hoffman, J. C., Cowan, K. N., and Rappazzo, K. M. (2022). Beneficial Use Impairments, Degradation of Aesthetics, and Human Health: A Review. *International Journal of Environmental Research and Public Health*, 19(10):6090. https://doi.org/10.3390/ijerph19106090.

Sovacool, B. K. and Furszyfer Del Rio, D. D. (2020). Smart home technologies in Europe: A critical review of concepts, benefits, risks and policies. *Renewable and Sustainable Energy Reviews*, 120:109663. https://doi.org/10.1016/j.rser.2019.109663.

Su, Y. and Zhao, H. (2023). Infiltration Approach of Green Environmental Protection Education in the View of Sustainable Development. *Sustainability*, 15(6):5287. https://doi.org/10.3390/su15065287.

Thampanichwat, C., Moorapun, C., Bunyarittikit, S., Suphavarophas, P., and Phaibulputhipong, P. (2023). A Systematic Literature Review of Architecture Fostering Green Mindfulness. *Sustainability*, 15(4):3823. https://doi.org/10.3390/su15043823.

Vaughan, J. and Ostwald, M. J. (2022). Measuring the geometry of nature and architecture: comparing the visual properties of Frank Lloyd Wright's Fallingwater and its natural setting. *Open House International*, 47(1):51–67. https://doi.org/10.1108/OHI-01-2021-0011.

Wilson, E. O. (1984). *Biophilia: the human bond with other species*. Harvard University Press, Cambridge, Massachusetts, and London, England. https://archive.org/details/edward-o.-wilson-biophilia.

Xu, A., Wang, C., Tang, D., and Ye, W. (2022). Tourism circular economy: Identification and measurement of tourism industry ecologization. *Ecological Indicators*, 144:109476. https://doi.org/10.1016/j.ecolind.2022.109476.

Yaseen, F. R. and Mustafa, F. A. (2023). Visibility of nature-connectedness in school buildings: An analytical study using biophilic parameters, space syntax, and space/nature syntax. *Ain Shams Engineering Journal*, 14(5):101973. https://doi.org/10.1016/j.asej.2022.101973.

Yevtuch, M., Fedorets, V., Klochko, O., Branitska, T., and Kozeruk, Y. (2021a). Actualization of metacognitive abilities and archetypal measurement of consciousness in the context of improving the health-preserving competence of physical education teacher. *Journal of Physical Education and Sport*, 21(Suppl. issue 5):3084–3093. https://doi.org/10.7752/jpes.2021.s5410.

Yevtuch, M. B., Fedorets, V. M., Klochko, O. V., Kravets, N. P., and Branitska, T. R. (2021b). Ecological and axiological reflection of the concept of sustainable development as a basis for the health-preserving competence of a physical education teacher. *SHS Web of Conferences*, 104:02008. https://doi.org/10.1051/shsconf/202110402008.

Zhong, W., Schröder, T., and Bekkering, J. (2022). Biophilic design in architecture and its contributions to health, well-being, and sustainability: A critical review. *Frontiers of Architectural Research*, 11(1):114–141. https://doi.org/10.1016/j.foar.2021.07.006.

Zuccaro, G. (2021). Recensione a "jorgenson k a; padgett a g, ecotheology: A christian conversation eerdmans, grand rapids, mi 2020". *ESSSAT News & Reviews*, 31(3):27–31. https://hdl.handle.net/10807/226548.

Žukauskaitė, A. (2020). Gaia Theory: Between Autopoiesis and Sympoiesis. *Problemos*, (98):141–153. https://doi.org/10.15388/Problemos.98.13.

"Branding Theory, Design and Identity" Course Teaching Experience for Modern IT Specialists

Viktoriia V. Bolotina[1][a], Tetiana A. Vakaliuk[1,2,3,4][b], Olha R. Harbych-Moshora[5][c] and Valerii V. Kontsedailo[6][d]

[1]*Zhytomyr Polytechnic State University, 103 Chudnivska Str., Zhytomyr, 10005, Ukraine*
[2]*Institute for Digitalisation of Education of the NAES of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine*
[3]*Kryvyi Rih State Pedagogical University, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*
[4]*Academy of Cognitive and Natural Sciences, 54 Gagarin Ave., Kryvyi Rih, 50086, Ukraine*
[5]*Drohobych Ivan Franko State Pedagogical University, Street Ivan Franko, 24, Drohobych, 82100, Ukraine*
[6]*Inner Circle, Nieuwendijk 40, 1012 MB Amsterdam, Netherlands*
viktoriia.polish@gmail.com, tetianavakaliuk@gmail.com, garbich79@gmail.com, valerakontsedailo@gmail.com

Keywords: Branding Theory, Design, Identity, IT Specialist, Laboratory Work, Brand Book, Brand Formation, Survey, Methodology, Creative Approach, Graphic Editors.

Abstract: This article contains a description of the author's methodology for teaching the course "Branding Theory, Design, and Identity". The article provides a list of topics studied by students. The results of students' work, their achievements, and analysis of the results of the teacher's work are described. The main goal in the development of the methodology is the formation of a high-quality IT specialist with the ability to approach the solution to various problems creatively. To achieve this goal, students are offered to work on one original topic within the framework of laboratory work. As a result, students prepare and present the brand book of their own company, having gone through all the stages of brand formation. The article presents the results of a survey of students on the quality of the proposed methodology, and positive and negative aspects of the teaching of the course are identified. Based on our observations, the methodology can be considered accurate, because, during the training, students showed the ability to creatively approach tasks, easily master various graphic editors and successfully combine them in practice.

1 INTRODUCTION

The modern world requires modern approaches in all areas of human activity. Ukraine and the world need high-quality specialists in all areas who can quickly, creatively, and efficiently solve non-standard tasks that humanity faces. Each future specialist in a different field, especially in the IT field, should always be ready to solve super-complex tasks, using the ability to analyze, make quick decisions, and find non-standard ways out of the current situation.

When preparing IT specialists, one should take into account the requirements of the labor market, and the relevance of the studied technologies that employers need. It is also important to form competencies that will help a future specialist to make a significant contribution to the development of the IT sector (Vakaliuk et al., 2020, 2021b).

Modern trends in the development of professional training of future IT specialists include specialization of education, substantiation of its content, multi-level nature, the formation of professional competencies and qualities, the flexibility of curricula, strengthening the practical orientation, the introduction of information technology in education, the involvement of interactive teaching methods, the individualization of teaching staff with high scientific and pedagogical potential, capable of productive professional communication in the field of IT education (Varava et al., 2021).

The development of creativity also contributes to a better solution to programming problems. The formation of a specialist as a creative person capable of self-development, self-education, and innovation is one of

[a] https://orcid.org/0000-0002-5122-8879
[b] https://orcid.org/0000-0001-6825-4697
[c] https://orcid.org/0000-0002-3172-5499
[d] https://orcid.org/0000-0002-6463-370X

Bolotina, V., Vakaliuk, T., Harbych-Moshora, O. and Kontsedailo, V.
"Branding Theory, Design and Identity" Course Teaching Experience for Modern IT Specialists.

In *Proceedings of the 4th International Conference on History, Theory and Methodology of Learning (ICHTML 2023)*, pages 191-203
ISBN: 978-989-758-579-1

the main tasks of higher education. The main focus of the work of teachers preparing IT specialists is to create conditions for the creative activity of students, while it is only necessary to stimulate the desire for creativity inherent in everyone. The organization of the educational process with the inclusion of elements of creative activity will make it possible to educate a comprehensively developed specialist who will have an innovative approach to future professional activities.

The main focus of the work of teachers preparing IT specialists is to create conditions for the creative activity of students, while it is only necessary to stimulate the desire for creativity inherent in everyone. The organization of the educational process with the inclusion of elements of creative activity will make it possible to educate a comprehensively developed specialist who will have an innovative approach to future professional activities.

In preparation for the research, an analysis of curricula and educational programs of students of IT majors was carried out, in particular, major 122 "Computer Science" Zaporizhzhia Polytechnic National University, specialty 121 "Software Engineering" Kharkiv National University of Radio Electronics, specialty 121 "Software Engineering" Cherkasy Bohdan Khmelnytskyi National University, specialty 121 "Software Engineering" National Technical University "Kharkiv Polytechnic Institute", specialty 122 "Computer Science" Lviv Polytechnic National University. The courses in these educational programs, in most cases, of a technical orientation and do not involve creative approaches to solving the tasks. In particular, to a greater extent in all higher education institutions, subjects related to programming are key, while graduates of IT specialties are in demand not only in the market of programmers, but also in the field of design and computer graphics. As a result, there is a need to implement new teaching methods that contribute to the formation of creative and creative competencies in students of IT specialties.

Creative courses in the training of IT specialists contribute to the formation of such competencies as the ability to apply knowledge in practical situations; the ability to generate new ideas (creativity); ability to search, process and analyze information from different sources.

At the Zhytomyr Polytechnic State University, students of the IT industry study the course "Branding Theory, Design, and Identity" (by the training curriculum specialty 122 " Computer Science"). When studying this course, students often turn to creative research, develop analytical skills, and independently go through the entire life cycle of a brand. After completing the course, students can work in the direction of design, namely the development of corporate identity or promotional products.

2 THEORETICAL BACKGROUND

The problem of high-quality training of IT specialists in the current state of digitalization of society is raised in many scientific papers. For the formation of different competencies in the professional training of IT specialists, scientists consider different methodologies.

Petrenko et al. (2020) describes the use of pedagogical crowd technologies in the professional training of future information technology specialists and also analyzes the impact of using mobile devices and online services when learning foreign languages. The authors have developed an experimental conceptual model for the use of pedagogical crowd technologies (Petrenko et al., 2020). The article states that training using crowd technologies implies a general set of pedagogical conditions aimed at developing the necessary competencies for the professional activities of IT specialists in the future. The authors conducted an experiment, which proved the feasibility of using modern online services at all stages of the educational process when formulating a goal, learning new material, and controlling knowledge. It is also possible to simultaneously use different types of a crowd – crowd teaching, and crowd assessment both in a complex and each type separately. The effectiveness of the introduction of the conceptual use of pedagogical crowd-technologies is indicative: the level of motivation has increased and the cognitive interest of students and their activity in the classroom has increased, work in groups became coordinated, and relationships became trusting (Petrenko et al., 2020).

The works of Striuk et al. describes the experience of the Department of Simulation Software Engineering of the Kryvyi Rih National University in solving the problems of training IT specialists in modern conditions, and the author presents the main trends and technologies that are advanced for the formation of well-trained specialists who become competitive in the market. Students take part in projects and receive high-quality training that allows them to enter the working environment of the IT market with a formed set of knowledge and skills necessary for a successful start of their career in IT companies (Striuk and Semerikov, 2019, 2022; Striuk et al., 2022).

To determine the main approaches and teaching methods for IT specialists, it is important to identify the most common problems that future special-

ists face during the development of the course. The works by Vakaliuk et al. describes the problems of professional training of future IT specialists in the educational and information environment of a technical university. The authors notes that the processes that are constantly changing the education system and approach to learning and teaching significantly affect the formation of the competencies of future specialists. The authors refers to such problems as the rapid updating of knowledge. The main task that is set for higher education institutions in the training of IT specialists is to quickly adapt to dynamically changing conditions. Students are required to independently acquire the knowledge and skills necessary for successful work, apply them in practice to solve various problems; independently, critically think, be able to see the problems that arise in reality, and look for rational ways to solve them using modern technologies; work efficiently with information to solve the tasks; be able to work in teams that bring together specialists from different fields of knowledge (Vakaliuk, 2021; Vakaliuk et al., 2021a, 2023).

To constantly improve the methods of training IT specialists, various areas of education should be introduced. The book of Duran et al. (2015) reports the results of a three-year research program funded by the National Science Foundation which targeted students and teachers from four Detroit high schools in order for them to learn, experience, and use IT within the context of STEM (IT/STEM), and explore 21st century career and educational pathways. The book discusses the accomplishment of these goals through the creation of a Community of Designers – an environment in which high school students and teachers, undergraduate/graduate student assistants, and STEM area faculty and industry experts worked together as a cohesive team. The program created four project-based design teams, one for each STEM area. Each team had access to two year-round IT/STEM enrichment experiences to create high-quality learning projects, strategies, and curriculum models. These strategies were applied in after school, weekend, and summer settings through hands-on, inquiry-based activities with a strong emphasis on non-traditional approaches to learning and understanding.

Szymkowiak et al. (2021) describes the importance of using modern information technologies in the preparation of students in different areas. The authors point out that the Internet represents an important place as a "source of expansion of horizons".

In preparing high-quality future specialists, a fundamental principle is an accessible education for everyone. As noted Haleem et al. (2022), one of the fundamental components of the UN sustainable development agenda until 2030 is quality education. It aims to provide inclusive and equitable quality education for all. Information technology has become an important tool for achieving this goal. The study examines questions aimed at determining the importance of introducing information technologies into the educational process, and what changes can be achieved as a result.

The most important indicator of the quality of the university is the rate of employment of graduates after graduation from higher education. For graduates to be ready for employment in the company, the learning process must go beyond the formation of skills and the transfer of knowledge, and the existing competencies must meet the requirements of the market. Albina and Sumagaysay (2020) explores the employment of graduates of information technology education at a public university in the Philippines.

Weng et al. (2022) explores the issue of the formation of creativity and entrepreneurship of students through real education based on the creation of problems. The study identified how real-world problem tasks contributed to student creativity in the dimensions of novelty, usefulness, aesthetics, authenticity, and entrepreneurship in the areas of ideas and opportunities, resources, and activities throughout the learning stages. The development of creativity is an important aspect of the education of students of various specialties, including technical ones.

Higher education institutions work closely with specialized companies interested in high-quality personnel – university graduates. There is a close relationship between the software development industry and IT education. Cico et al. (2021) explores the main trends in software engineering in the academic environment. In the course of the study, the authors notes that trends such as software adoption, usability, and global software engineering are relatively small in the academic community, and also that there are certain differences between the field of software engineering development and the training of IT specialists.

However, teaching creative courses to IT professionals has not yet been studied, and therefore requires attention.

The **purpose** of the article is to describe the author's methodology for teaching the course "Branding Theory, Design, and Identity" and to study its feasibility in the training of modern IT specialists.

3 METHODS

We used the following methods to conduct the research:

- A systematic method and explanation for describing the methodology of teaching the course "Theory of Branding, Design and Identity".
- Visual methods for a visual demonstration of the results of students' work on assigned tasks within the framework of laboratory work and display of the results of the use of project presentation tools.
- Survey, to conduct a questionnaire to determine the expediency of the implemented methodology for teaching the course "Theory of Branding, Design and Identity".

4 RESULTS

When preparing IT specialists, an important aspect is the development of the creative skills of future specialists. The labor market in the field of information technology is constantly changing, as are the criteria for selecting employees.

As part of the course "Branding Theory, Design and Identity", the main goal is to prepare high-quality specialists in the direction of developing a corporate identity and developing the creative abilities of specialists studying technical specialties.

The purpose of the course is to familiarize students with the basic concepts and established units of corporate identity development, branding, and corporate identity, the practical use of graphic editors to create an identity; development of a brand book, familiarization with the main stages of the presentation of the project, and working with the customer; to get acquainted with the concept of "corporate style", "guideline", "brand", and "naming".

After completing the course, students will be able to demonstrate real corporate identity development solutions and learn to analyze the elements and components of corporate identity. In addition, the implementation of all laboratory work implies the development of a full cycle of corporate identity. In the theoretical blocks of the course, students get acquainted with the main stages of working with a customer, the theory of presentation, and the defense of their project.

Here is an indicative list of topics for studying this course:

1. Introduction. The concept of branding, corporate identity, and corporate style. Basic concepts of branding. Brand building. The concept of identity. Features of the use of corporate identity. Elements of the corporate identity of the company.
2. Types of computer graphics. Work with vector graphics. Resources for creating your own corporate identity. Work with color and text in Adobe Illustrator. Work with primitives.
3. Logo. Corporate style constants. Graphic image. History of logos. Symbolism in the brand name. Stages of creating a logo. Types of logos. Classification and semantic overload of corporate symbols.
4. Logo. Formation of a palette of corporate colors and fonts. Selection of font pairs in the logo. Psychology of color perception. The semantic load of color in the system of corporate identity.
5. Corporate business documentation. Design rules. Development of business documentation, and its role in the corporate identity system. Business cards as a means of communication. Letterhead and business identification. Corporate envelopes and folders.
6. Work with raster graphics. Mockup. How to create a mockup. Processing existing presentation templates through raster graphics editors.
7. Rules for the design of outdoor advertising. Types of outdoor advertising. Stages of development. Formation of an advertising offer. The effectiveness of advertising media.
8. Combination of raster and vector graphics. Graphic techniques in advertising. Combination of vector and raster graphics in design layouts. Work with vector graphics in a raster graphics editor. Creation of advertising compositions.
9. Corporate website and advertising on the Internet. Types of corporate websites. Stages of creation. Creation of a corporate blog using online designers. Advertising on websites and the Internet.
10. Composition and visual hierarchy in web design. Rules for constructing a visual composition. Principles of building web page architecture. Selection of fonts and colors for the website.
11. Point of sale. POS types. Ways to influence the buyer. Printed advertising products.
12. Brand book development, design rules. Types of brand books. Basic design rules. Image and visual component. The guideline, logo book.
13. Work with the customer. Principles of project presentation.
14. Corporate periodicals. Advertising in the media space. Types of corporate periodicals. Types of media advertising, principles of creation.

When studying the first topic, students get acquainted with the concept of branding and corporate identity. When entering the course, special attention

is paid to the review of existing brands, the study of the history of the creation of their corporate identity, and changes in the process of rebranding. For a more detailed immersion in the concept of branding and consolidation of the studied stages, students need to prepare a presentation using free software on the topic "Corporate Identity of a World Famous Brand". As a result of completing the task, students form the image of the brand and understand the approaches to its creation.

The unique approach to performing laboratory work in this course is that each student works on his topic throughout the course, which provides an individual approach to completing tasks. In the first lesson, students are invited to choose their topic and develop terms of reference for working on a brand book on the chosen topic. The theme can be any nonexistent company or one that was created recently and does not have its own corporate identity.

Analyzing the results of students after studying the first topic, one should pay attention to the fact that at this stage of mastering the course, when preparing a presentation about one of the well-known brands, students learn to make a creative search, analyze the existing corporate identity, separate its main components and present it. Another important skill to be formed is the ability to set clear goals and requirements for your future project in the form of a technical assignment.

The next stage in the work of students is to gain skills in working with vector graphics, which becomes the basis for creating corporate identity constants. To consolidate the acquired skills, students create illustrations using a vector graphics editor. Also, one of the tasks of the next topic is to prepare background images for the upcoming presentation on the previously selected topic.

The result of the work is a set of vector images created using a vector graphics editor. Tasks of this type allow you to learn new tools that will be useful in future work. When creating illustrations, students learn to choose shades and build a composition. Some of the students of the course, as practice shows, depart from the proposed samples and create new or improved existing illustrations, which indicates the manifestation of creativity and independence in work.

The basis of the entire course is the third theme. It is built in such a way that after completing all the tasks, students receive the basic elements of corporate identity, based on which the entire corporate identity is raised.

The first task of this theme is to create a mood board as a means of conveying mood and design style figure 1. The next important stage in the work of students is the study of a competitive market in their chosen field. By doing research, you can ensure a high-quality and unique design, while avoiding plagiarism in the name and stylistic features. After conducting preparatory studies, students move on to the most important stage in the development of a corporate identity – a logo. To begin with, sketches are developed based on reference projects selected by students. From the sketches, one version of the logo is selected, which is necessarily finalized and presented. In the technical part of the corporate identity constants section, an important point is the technical requirements for using the logo in all corporate-style media. Students prepare requirements for the minimum distance between the logo and stylistic elements in layouts, and provide for the design of unacceptable options for using the logo, namely, changing colors, deleting existing or adding new graphic objects, disproportionate transformation, etc. (figure 2).

During the study of this topic, students form a palette of corporate colors with a description of the stylistic load and select font pairs, indicating their combination and use in advertising, souvenirs, and branded business documentation.

When studying this topic, again, as experience shows, students present a whole range of developments on their topic, which involves several stages. To begin with, market research, competitors, and the uniqueness of the product or service are presented. At the same time, the concept of work is based on a thorough study of the topic and the history of the product. Most of the student's present hand-drawn logo sketches in their work, indicating that the students were keen to develop a truly own and unique logo. When selecting colors, students use specialized resources such as Adobe Color (Adobe, 2023), as well as build a color palette based on theoretical material on the topic of the lecture "Color Theory". As part of this work, students selected font pairs, as a result of which a clear distribution of typefaces for use in the logo and use in business documentation was demonstrated.

After the development and technical description of corporate identity constants, students proceed to the design of business documentation (figure 3). In preparation for this stage, students learn how to correctly present their work using a mockup. A mockup is a special layout, an image of a real object, on which a design element is superimposed: a logo, a cover, a screenshot, and so on. Mockups allow you to immediately see how the object will look in reality.

It is important to note that students are encouraged to use resources with stock raster and vector images throughout their study of the "Branding Theory, De-

Figure 1: Mood board example.

sign and Identity" course to use their resources in their designs. Namely, Unsplash (unsplash.com, 2023) is a stock of bitmap files, Pixabay (pixabay.com, 2023) is a storage of bitmap graphics, and Freepick (freepik.com, 2023) is a stock for searching source files of vector and bitmap graphics. Students also use well-known portfolio sites to keep track of current corporate identity design trends.

The next step in creating the identity of the selected company, students to develop corporate business documentation. The task consists of designing business cards, and letterhead, and designing envelopes for correspondence. A business card is created, at the choice of the student, personal or general for the company. The letterhead is submitted for verification in two versions – the main and the black-and-white version. Branded envelopes are presented in C6 and Euro formats. When developing corporate business documentation, students adhere to the corporate style, colors, and fonts selected earlier. When presenting all elements, mockups are used, the style of which reflects the mood of the company.

Expanding the set of corporate identity elements, students move on to creating layouts for advertising media – billboards, and signboards (figure 4). When getting acquainted with the topic of External advertising, an important step is to get acquainted with the principles of creating a unique advertising offer, the principles of advertising design, and matching the layout to the corporate style. The outdoor advertising media provided for creation clearly show the rules for using corporate identity in advertising. During the presentation of layouts, students test for compliance with the design and localization of the advertising media site.

Advertising design is a new direction for students. When developing advertising layouts, each of the students analyzes the existing, high-quality, and popular advertising forms their advertising offers and presents them on the appropriate sites. The results of the work,

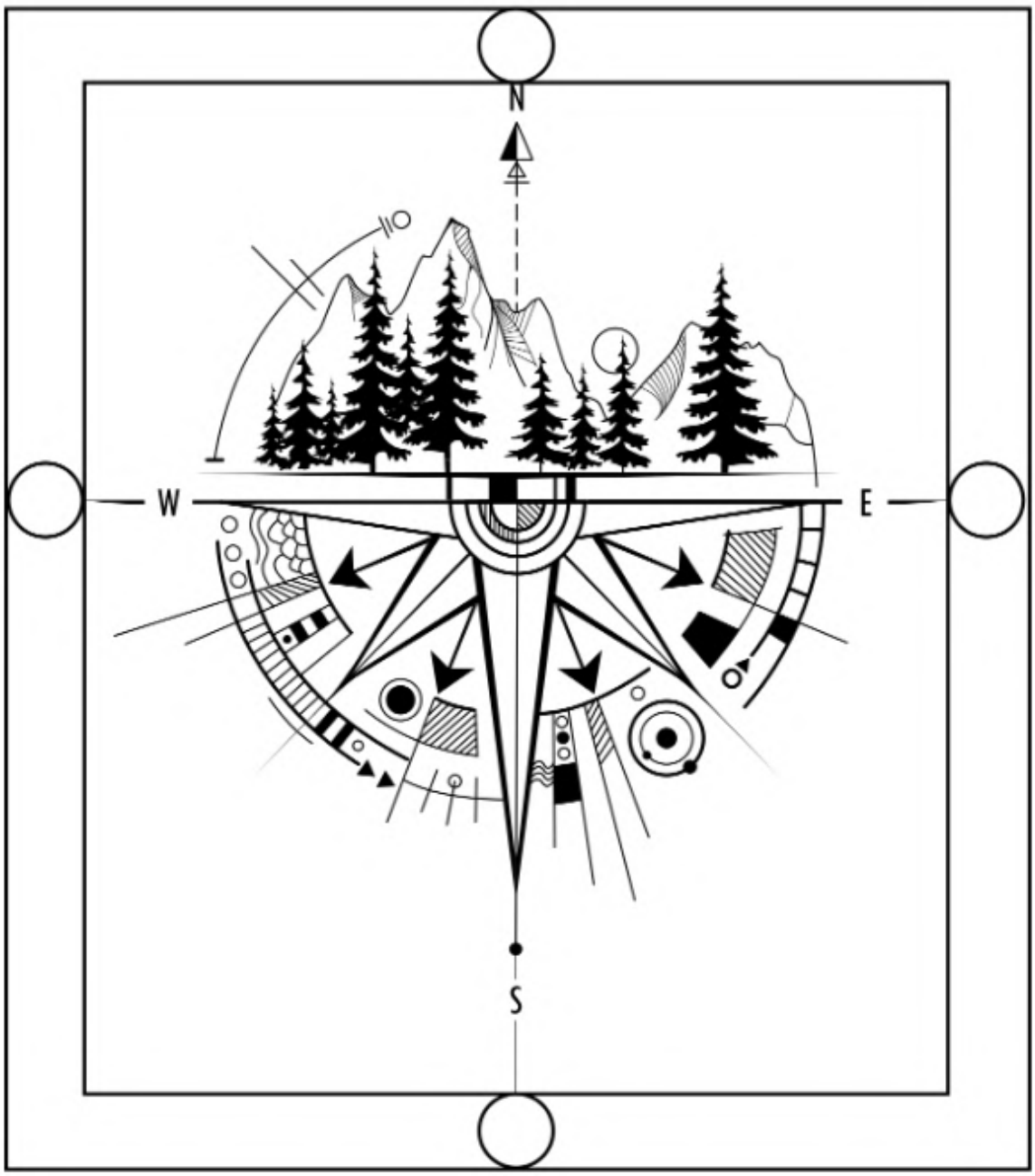


Figure 2: Logo red lines example.

as experience shows, are very diverse in terms of the creative potential of each of the students and their skills as graphic editors.

Another important direction in the corporate style of the company is the dissemination of information about the brand on the Internet. Online advertising occupies an important place in brand promotion, and the design of a corporate website is an indispensable condition for the formation of the integrity of corporate identity. Students, using the software, make out the main page of the corporate website. One of the types of corporate web resources is selected by the theme. When designing the main page of the site, students must follow the rules of their own corporate identity and corporate style, use corporate colors and fonts, displaying the company’s theme in the smallest

Figure 3: Documentation example.

Figure 4: Billboard example.

details of web design. The next task is to develop banners for advertising on the Internet. In banners, students form three different promotional offers to promote the company on web pages and social networks.

The result of the work is the presentation of the corporate website design and a set of three banners for advertising on the Internet.

When performing this work, the adaptability of students in the use of various software tools and web resources is observed. Students are encouraged to use available website builders and online editors to create interface prototypes. At the same time, students also demonstrate how the corporate identity of the company works on web resources of various types, which is an important step in the development of corporate identity because at present the main promotion of companies occurs through the Internet.

The final stage is the development of a line of souvenirs, a set of packaging, and the development of a design for branded clothing for employees (figure 5). The elements of souvenir products for each student may differ, depending on the correspondence between the theme of the project and souvenir products. Souvenirs, branded packaging, and clothing are designed by students by their own corporate identity.

When demonstrating souvenirs, packaging, and branded clothing, students use mockup files. The main requirement was that students use a mockup of the same style, fit their subject, and the general concept of corporate identity.

The final work of the course "Branding Theory, Design and Identity" is the formation of a company's brand book on the chosen topic, on which students worked individually during the course. Valid project presentation options are a printed version, an electronic version in PDF, or a brand book in the form of a website. All parts of the corporate identity are presented as file mockups. In the working version of the brand book, students include the following sections: about the company; logo; corporate colors; corporate fonts; business documentation (business card, letterhead, envelope); outdoor advertising (billboard, signboard); souvenir products (at least three units); branded packaging (at least three units); branded clothing.

When submitting the final project, each student will present his work on all the requirements for the presentation of projects in IT companies (see figure 6). As part of the lectures, students are provided with material for working with the customer, the basics of creating technical specifications, and briefing.

To determine the appropriateness of the teaching methodology for this course, we analyzed two final works of students in the course "Branding Theory, Design and Identity". Each student studied full-time and completed a full course of lecture material and laboratory work. As a result, the company's brand book on a unique theme was submitted for review.

The first work for analysis was the work on the topic "Beast Gym Sports Club". "Beast Gym" – a network of gyms for people mainly from 12 years old of any category, interested in maintaining physical health, improving health, and changing lifestyles. The main goal is to provide training services, spread the ideas of a healthy lifestyle, and help achieve sports goals (figure 7).

The chosen stylistic design of the brand book is fully consistent with the chosen theme. The logo as a corporate identity constant is completely accurate and reflects the style and character of the institution. The symbol in the logo consists of the image of a lion and a dumbbell, which he holds in his teeth.

The technical description of the use of corporate identity constants is complete, there are examples of business documentation, outdoor advertising, souvenirs, branded packaging, and clothing.

The following work is done in a classic, minimalist style. The theme of the work is "Black Rabbit Barbershop Network" (figure 8).

All requirements have been met. It should be noted that the student completed a complete description of the history of brand creation, which is an important step in the formation of corporate identity and corporate style. The brand book contains all the required sections, and the results of the work are presented in the form of a mockup.

It should be noted that the reviewed works were completed in compliance with all requirements, taking into account the theoretical material of the lectures. However, each of the works is unique in its theme, style, and technical description, which indicates that when developing brand books, students used a creative approach to work, laboratory work was able to form the ability to generate new ideas, engage in creative search and bring ideas to life.

5 DISCUSSION

To determine the feasibility of the introduced methodology for teaching the course "Branding Theory, Design and Identity", an anonymous survey of students trained according to this methodology was conducted. Applicants for higher education must answer the following questions:

1. Do the course assignments match the lecture materials and laboratory assignments?
2. Do the topics fit the learning objectives of the course?
3. Select the topics that you think are 100% necessary.

Figure 5: Branded clothing example.

Figure 6: Business document presentation example.

4. Select topics to remove.
5. Write down what topics you think could be covered in this course.
6. How interesting was the course for you.
7. What do you remember most about your studies?

40 second-year students of specialty 122 “Computer Science” were involved in the survey. Participation in the survey was voluntary and anonymous.

Figure 7: “Beast Gym” brand book cover.

Figure 8: “Black Rabbit” brand book cover.

After working through the results of the survey, it was found that students were happy to study this course, and all the topics proposed for study are fully consistent with the goals of the course. Since the students who participated in the survey study were only in the 2nd year, everyone answered the same questions for 3, 4, and 5 questions (that all topics are needed for studying, nothing needs to be added and taken away).

The results of the student survey indicate that it is difficult for students to adapt quickly to a creative environment. Part of the students have difficulties at

the stage of forming the topic of the work. This is due to insufficient immersion in corporate identity trends of companies of different directions and locations.

Since the beginning of work on the graphic component of the brand is the creation of a logo, students feel a lack of material for forming the concept and idea of the brand. Formation of the brand's mission and philosophy is an important stage in the development of corporate identity.

As a solution to this problem, within laboratory work, which precedes the creation of the logo, students are offered to delve into the topic of their choice:

1. Analyze the relevance of the product or services.
2. Research the competitive market locally.
3. To identify the relevance of the products or services offered by them among others on the market.
4. Form the target audience and develop user portraits.
5. Describe the philosophy of the brand and form a mission.

The next problem that students face is the presentation of work. After all, the success of the project as a whole depends on the presentation of the materials. Most students lack oral presentation skills and use outdated resources to present visual materials. The solution to this problem is to provide students with electronic resources of collections of mockups that they can use in their works.

Regarding what was most memorable when studying this course, the students indicated that it was the opportunity to use any means (there was no link to specific means, which the students liked), the teacher's creative approach to tasks, and, accordingly, students. implementation of the tasks.

Summing up and taking into account the interviews of students conducted during the defense of final works, the main advantages and disadvantages of the proposed methodology were identified. Among the disadvantages are:

- a complex adaptation of technical students in a completely creative environment;
- insufficient amount of lecture material for perfect mastery of graphic editors.

Benefits include:

- improving the skill of oral presentations;
- development of creative thinking;
- elaboration of quite individual thinking;
- application of acquired skills in vocational education.

6 CONCLUSIONS

The introduction of creative courses into the curricula of students studying technical specialties is an integral part of the formation of a high-quality IT specialist. When developing the teaching methodology "Branding Theory, Design, and Identity", the main requirement was to ensure the formation of the ability to generate new ideas (creativity) and teach students to independently search, process, and analyze information from various sources. As external resources, students are offered services for publishing the work of designers, including corporate identity design. During the laboratory work, students have the opportunity to work on a topic of interest to them, developing a design for that area of activity that interests them, which as a result increases students' motivation to perform laboratory work.

As a result of taking the course "Branding Theory, Design and Identity", students learned creative search and analysis, learned the stages of brand formation. Each of the course participants developed their own corporate identity and prepared a working version of the brand book by the evaluation criteria. The course methodology allows students to develop such competencies as the ability to apply knowledge in practical situations, the ability to generate new ideas (creativity), and the ability to search, process, and analyze information from different sources. During the training, students showed the ability to creatively approach tasks, easily master different graphic editors and successfully combine them in practice.

During the implementation of this methodology, we discovered some difficulties that students face during their studies, namely the problem of rapid immersion in the creative space, the insufficient study of graphic editors, and a noticeable lack of material for forming the concept and idea of a brand. Each of these problems will be worked out in detail by the authors in the future, which will allow us to expand the course by adding new theoretical material and some practical tasks.

The prospects for further research include the selection of criteria and indicators for the selection of digital learning tools for studying this course, as well as to carry out the appropriate expert selection.

ACKNOWLEDGEMENTS

This work was carried out thanks to the named scholarship of the Verkhovna Rada of Ukraine for young scientists – doctors of sciences for the year 2022.

REFERENCES

Adobe (2023). Adobe Color. https://color.adobe.com/.

Albina, A. C. and Sumagaysay, L. P. (2020). Employability tracer study of Information Technology Education graduates from a state university in the Philippines. *Social Sciences & Humanities Open*, 2(1):100055. https://doi.org/10.1016/j.ssaho.2020.100055.

Cico, O., Jaccheri, L., Nguyen-Duc, A., and Zhang, H. (2021). Exploring the intersection between software industry and Software Engineering education - A systematic mapping of Software Engineering Trends. *Journal of Systems and Software*, 172:110736. https://doi.org/10.1016/j.jss.2020.110736.

Duran, M., Höft, M., Medjahed, B., Lawson, D. B., and Orady, E. A. (2015). *STEM learning: IT integration and collaborative strategies*. Springer International Publishing. https://doi.org/10.1007/978-3-319-26179-9.

freepik.com (2023). Free Vectors, Stock Photos & PSD Downloads. https://www.freepik.com/.

Haleem, A., Javaid, M., Qadri, M. A., and Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3:275–285. https://doi.org/10.1016/j.susoc.2022.05.004.

Petrenko, L. M., Shevchenko, V. P., and Zelikovska, O. O. (2020). Leveraging crowd-based technologies for education in it-students professional training. *Information Technologies and Learning Tools*, 76:213–235. https://doi.org/10.33407/itlt.v76i2.3378.

pixabay.com (2023). Stunning free images & royalty free stock. https://pixabay.com/.

Striuk, A. M. and Semerikov, S. O. (2019). The dawn of software engineering education. *CEUR Workshop Proceedings*, 2546:35–57.

Striuk, A. M. and Semerikov, S. O. (2022). Professional competencies of future software engineers in the software design: teaching techniques. *Journal of Physics: Conference Series*, 2288(1):012012. https://doi.org/10.1088/1742-6596/2288/1/012012.

Striuk, A. M., Semerikov, S. O., Shalatska, H. M., and Holiver, V. P. (2022). Software requirements engineering training: problematic questions. *CEUR Workshop Proceedings*, 3077:3–11.

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., and Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, 65:101565. https://doi.org/10.1016/j.techsoc.2021.101565.

unsplash.com (2023). Beautiful Free Images & Pictures. https://unsplash.com/.

Vakaliuk, T. (2021). Structural model of a cloud-based learning environment for bachelors in software engineering. *Educational Technology Quarterly*, 2021(2):257–273. https://doi.org/10.55056/etq.17.

Vakaliuk, T., Spirin, O., and Kontsedailo, V. (2021a). Criteria for selecting open web-oriented technologies for teaching the basics of programming to future software engineers. *Educational Technology Quarterly*, 2021(1):73–86. https://doi.org/10.55056/etq.16.

Vakaliuk, T., Spirin, O., and Kontsedailo, V. (2021b). Formation of digital competence of CS bachelors in the use of cloud-based learning environments. *Educational Technology Quarterly*, 2021(3):388–401. https://doi.org/10.55056/etq.26.

Vakaliuk, T. A., Chyzhmotria, O. V., Chyzhmotria, O. H., Didkivska, S. O., and Kontsedailo, V. V. (2023). The use of massive open online courses in teaching the fundamentals of programming to software engineers. *Educational Technology Quarterly*, 2023(1):106–120. https://doi.org/10.55056/etq.37.

Vakaliuk, T. A., Kontsedailo, V., Antoniuk, D., Korotun, O., Semerikov, S., and Mintii, I. S. (2020). Using Game Dev Tycoon to Create Professional Soft Competencies for Future Engineers-Programmers. In Sokolov, O., Zholtkevych, G., Yakovyna, V., Tarasich, Y., Kharchenko, V., Kobets, V., Burov, O., Semerikov, S., and Kravtsov, H., editors, *Proceedings of the 16th International Conference on ICT in Education, Research and Industrial Applications. Integration, Harmonization and Knowledge Transfer. Volume II: Workshops, Kharkiv, Ukraine, October 06-10, 2020*, volume 2732 of *CEUR Workshop Proceedings*, pages 808–822. CEUR-WS.org. https://ceur-ws.org/Vol-2732/20200808.pdf.

Varava, I. P., Bohinska, A. P., Vakaliuk, T. A., and Mintii, I. S. (2021). Soft Skills in Software Engineering Technicians Education. *Journal of Physics: Conference Series*, 1946(1):012012. https://doi.org/10.1088/1742-6596/1946/1/012012.

Weng, X., Chiu, T. K. F., and Tsang, C. C. (2022). Promoting student creativity and entrepreneurship through real-world problem-based maker education. *Thinking Skills and Creativity*, 45:101046. https://doi.org/10.1016/j.tsc.2022.101046.

AUTHOR INDEX

Atamanenko, I. 31

Batsurovska, I. 5
Belokon, K. 50
Bielikova, O. 148
Bolotina, V. 191
Bondarenko, O. 138
Bratko, M. 163
Brovko, K. 21

Cherednychenko, O. 61
Chernous, L. 73
Cwer, A. 13

Danysko, O. 31
Diahyleva, O. 122

Fedorets, V. 173

Golota, N. 21

Hanchuk, O. 138
Harbych-Moshora, O. 191
Holovatenko, T. 130
Hostra, K. 41
Hulai, O. 107
Huzik, U. 98

Ivanova, S. 156

Kalashnikova, L. 73
Kalina, K. 61
Kanevska, O. 41
Karpenko, T. 73
Kholoshyn, I. 138
Khoruzha, L. 163
Klimova, S. 61
Klochko, O. 173
Kolomoiets, T. 148
Kononova, O. 122
Kontsedailo, V. 191
Kornosenko, O. 31
Kupchyk, L. 85
Kurbatova, T. 50
Kurienkova, A. 148

Lakomova, O. 73
Leontieva, I. 163
Litvinchuk, A. 85

Mantulenko, S. 138
Mikhailutsa, O. 50
Mintii, I. 114, 156
Moroz, I. 107
Mosiyevych, L. 50

Naumenko, M. 21
Nedria, K. 61
Nezhyva, L. 21

Palamar, S. 21, 163
Parfanovich, I. 98
Pozhuyev, A. 50

Semerikov, S. 156
Serhiienko, M. 31
Shemet, V. 107
Shymon, O. 156
Spirin, O. 156

Trubavina, I. 61, 98

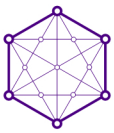
Vakaliuk, T. 156, 191
Varfolomyeyeva, I. 138

Yurzhenko, A. 122

Zavalniuk, O. 73
Zhelanova, V. 163

SUPPORTED BY:

AVAILABLE AT:



ACADEMY OF COGNITIVE
AND NATURAL SCIENCES

ISBN: 978-989-758-579-1