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Effectiveness of using augmented reality technology in the educational process

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Abstract. The relevance of studying augmented reality (AR) technology in education is driven by the rapid advancement of digital technologies and the need for modernising education. As society undergoes technological transformation, educational institutions must adapt to ensure high-quality education that meets modern labour market demands. Exploring AR's implementation is crucial for developing innovative methods and tools that align with the needs of today's students. The purpose of the study was to analyse augmented reality technology, identify its types, and examine the possibilities and benefits of introducing augmented reality technologies in educational institutions. The study was conducted using theoretical methods such as analysis, synthesis, generalisation, and systematisation. The article offered the author's vision of the effectiveness of using augmented reality technology in the educational process based on the analysis of research by Ukrainian and foreign scholars who consider this technology to be a modern teaching tool. It analysed the classification of augmented reality systems by the type of transmitted information, receivers, user interaction, and mobility. Given that augmented reality technologies in education are currently in their infancy, the author presented foreign and Ukrainian experiences regarding the use of augmented reality technologies in education and outlined the possibilities and advantages of their use in the educational process. The integration of augmented reality technologies into the educational processes at Stanford, Harvard, and UK universities was highlighted. The practical significance of the study lies in identifying the real advantages and challenges associated with its implementation in the educational process. The results of the study will contribute to the development of methodological recommendations, educational tools, and applications that maximise the potential of augmented reality

Keywords: immersive technologies; virtual reality; visualisation of educational material; digitalisation of education; mixed reality

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INTRODUCTION

Modern education is developing rapidly, responding to current requirements and technological advancements in society. One of the innovative tools in the field of education is immersive learning technologies, in particular

augmented reality (AR), which allows students to experience a heightened level of interactivity and immersion in the educational process. The use of augmented reality (AR) in educational institutions has the potential to transform



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the traditional learning process and provide a unique immersive experience. Students can learn subjects not only from books or screens but also by immersing themselves in virtual environments where they can experiment and interact with materials in a more dynamic way.

Visibility, material focus, manageability, safety, and efficiency (compared to conventional PC use) are key factors enhancing the didactic potential of immersive technologies in education (Kriukova, 2021). With AR, students can not only consume information but also actively interact with it, encouraging a deeper understanding of the material. Augmented reality enables the overlaying of digital content onto the real world, creating an interactive learning environment. This, in turn, personalises the learning process and enhances learning efficiency. The use of augmented reality technology is one of the most significant technological trends in the modern educational process.

Recent research on the use of AR in education highlights the potential benefits of this technology. For instance, M. Kisilova (2021) notes that adopting an integrated approach to education, built on problem-based learning and cross-curricular integration, makes it advisable to use modern educational technologies, including VR, in the classroom. Several studies indicate increased student interest, motivation, and academic performance when using AR.

The introduction of augmented reality technology into the educational process of higher education institutions has been analysed by Ukrainian researchers, such as T. Hrunтова *et al.* (2018), who highlight that the adoption of these technologies in education enhances its effectiveness, promotes active student involvement in learning, improves knowledge assimilation and perception, sustains interest in learning, and develops students' research and subject-specific skills. They theoretically justified the use of augmented reality technology and its features in higher technical education institutions. As a result of their research, L. Taranhul & S. Romaniuk (2022) discovered that an effective tool for supporting the educational process in higher education institutions using AR technologies is the HP Reveal platform. This platform offers several benefits, including enhanced visualisation of educational material and improvements to teaching methods and the educational process as a whole.

O. Merzlykin *et al.* (2018) emphasise that the effective teaching of modern students with unique educational needs requires the use of innovative technologies. This includes the use of mobile applications, the organisation of group work, interactive tasks, and the visualisation of educational material. V. Klymniuk (2018) highlights the diverse ways virtual reality can influence educational methodology, expanding the range of teaching methods and introducing new or improved approaches to learning. The researcher stresses that when developing and implementing virtual reality elements in multimedia teaching systems, it is important to consider the resources available at the higher education institution, the professional expertise of the developers, and the time allocated for integrating virtual reality into the educational process.

The rapid pace of technological progress necessitates constant updating of materials used for educational purposes. Educational laboratories are now actively experimenting with the use of interactive whiteboards, modelling software, and virtual reality environments. Although AR has been used in other fields for a long time, research into its potential application in educational institutions has only recently gained momentum. Augmented reality technology is relatively simple to use, but due to its pedagogical advantages, it has successfully attracted the attention of many educators. AR tools are widely used in educational institutions at various levels, from schoolchildren to teachers and PhD students, and for diverse educational purposes, ranging from language learning to astronomy. However, despite the potential benefits, a thorough study is needed to explore the opportunities augmented reality technology provides for educators, offering tools to enhance the learning process. The objective of the study was to analyse augmented reality technology, define and classify its types, and evaluate the possibilities and benefits of integrating augmented reality technologies into the educational process.

MATERIALS AND METHODS

Several theoretical methods were employed to study the effectiveness of augmented reality in the educational process. In particular, the analysis of scientific literature helped to ascertain how other researchers perceive the role of augmented reality in this area. Synthesis facilitated the combination of various data to create a holistic picture of how augmented reality is utilised in the educational process. The comparison of different approaches and models allowed for the identification of the most effective application strategies. Generalisation enabled the formulation of overarching conclusions about the role of augmented reality in modern education.

The research material comprised articles from scientific periodicals, conference proceedings, review articles, and studies by foreign and Ukrainian scientists working in the same area, primarily from the last five years (2019-2024). Older sources were included where their information remained timeless and relevant. The method of system-structural analysis was applied to identify key elements influencing the effectiveness of AR in education, particularly through the representation of foreign experiences, including the integration of augmented reality technologies into the educational processes of Stanford, Harvard, and UK universities. The method of comparative analysis of scientific and pedagogical literature helped to identify general trends, as well as similarities and differences in the authors' perspectives on the problem. It also enabled an assessment of how thoroughly and comprehensively the problem had been studied and identified key concepts and theories. This contributed to the formation of a clear and scientifically grounded understanding of the effectiveness of augmented reality technologies and facilitated the projection of directions for further research and development on the outlined issues.

The method of synthesis of theoretical and methodological provisions enabled the substantiation of the advantages and possible limitations of introducing AR into the educational process. This was achieved because the chosen method incorporates systematic analysis and integration of various scientific and methodological concepts to form a holistic view of the capabilities and advantages of augmented reality technologies. Using the method of data systematisation, a comprehensive view of the impact of AR on the educational process was developed, providing a foundation for informed decision-making regarding the implementation of these technologies. Classifications of augmented reality systems were analysed based on the type of transmitted information, type of receiver, degree of interaction with the user, and degree of mobility.

The method of generalisation was employed to draw overarching conclusions, formulate basic principles, and identify prospects for further research. The main stages of the study included substantiating the relevance of the research topic, studying the state of the object and subject of the research, selecting a research methodology, and discussing the results. These stages were aimed at identifying the main aspects of the subject and object under study – namely, the field of education in Ukraine and the impact of immersive technologies, particularly augmented reality technology. The study formulated conclusions outlining the role of this technology in the educational process, highlighted its main advantages and disadvantages, and identified areas for further research.

RESULTS AND DISCUSSION

Augmented reality, also known as mixed reality, is applied in a wide variety of areas, transforming the way people interact with the world. Augmented reality is a technology that enables the real-time combination of virtual objects with the real world using specialised devices, thereby creating an interactive environment. Unlike virtual reality (VR), which isolates the user from the real world, AR provides the ability to interact with both real and virtual environments simultaneously.

The term “augmented reality” was introduced by Boeing researcher Tom Codell in 1990. The terms “extended reality”, “enhanced reality”, “enriched reality”, and “magnified reality” are often used as synonyms for “augmented reality”. However, using these terms in a general sense is inaccurate, as they refer specifically to certain forms and aspects of augmented reality’s practical application. According to researcher N. Yermilova (2018), augmented reality is a technology for adding or introducing elements of virtual information into a person’s real life, displayed on a screen through technical means. The application of its capabilities in education has the potential to transform the learning process by providing the visual perception of the necessary information and reproducing certain processes with a visual representation of them in real size and dimensions. In the view of N. Honcharova (2019a), augmented reality is one of the most advanced technologies for visualising

educational material, which warrants further in-depth scientific research.

In A. Striuk’s (2018) research, augmented reality is presented as a novel interactive technology that overlays computer graphics, video, audio, or text information onto real-time objects. Researcher N. Rashevskaya (2018) highlights the positive impact of using augmented reality technology in teaching fundamental disciplines. I. Mintii & V. Soloviov (2018) note that among the challenges associated with integrating augmented reality into education, the lack of specialists developing educational content and the absence of cooperation between business and education in this area are particularly noteworthy. M. Shmyhol & Yu. Yushkevych (2019) discuss the mechanisms through which virtual reality influences the human worldview and argues that the transition to the virtualisation of modern information society arose from the need to elevate information technology to a qualitatively new level, thereby contributing to the development of the innate human need for creativity and the creation of new realities.

Augmented reality is a forward-looking technology that provides users with real-time data through geolocation and visual tools. Unlike virtual reality, which creates an entirely digital environment, augmented reality combines virtual elements with the real world, enhancing the environment and enabling interaction with reality. Virtual reality provides a simulation of an environment, which can be either real or fictional, using computer technology. Given the interconnectedness and interaction between the virtual and real worlds, users who engage with augmented reality experience a distinctly enhanced environment where virtual information serves as an additional, practical tool to support their daily activities.

Due to augmented reality technology, digital information can be embedded in the real world, significantly expanding the sensory data perceived by humans. This technology aims to enhance knowledge about the environment and improve the perception of information. To create augmented reality, a camera or other device capable of processing a video signal is used. A specialised program generates virtual objects and adds video and audio materials, 3D models, and text content to the image. Augmented reality technologies are capable of projecting digital information (e.g., images, video, text, graphics) beyond device screens and integrating virtual objects with the real environment. According to Z. Turan *et al.* (2018), augmented reality creates an opportunity to merge the virtual and real worlds, which can help students learn abstract and complex subjects. The results of their study showed that AR improves student performance and reduces cognitive demands (Thakral, 2020).

According to the type of information transmitted, augmented reality systems are divided into:

- visual systems, which are based on the principle that people perceive information primarily through visual channels, as this is the most accessible form of perception;
- audio systems, which focus on auditory perception;

- audiovisual systems, which combine the two previous systems, with audio information complementing visual data.

Augmented reality systems for obtaining information from the environment utilise a variety of receiver devices. Based on their types, the following categories are distinguished:

- optical or video information systems – these systems process the video signal received from a camera to create virtual objects in the real world. These systems can be: markerbased systems, which use special markers to detect and recognise objects; markerless systems, which function without markers, instead relying on ordinary images, volumetric bodies, and complex recognition algorithms; spatial tracking systems, which determine the position of objects in space based on real-time video stream analysis;

- geopositioning systems, which rely on signals from GPS global positioning systems;

- combined systems, which integrate both geopositioning and optical data to ensure maximum accuracy in determining the position of augmented reality objects in space.

Augmented reality systems can be classified according to the degree of interaction with the user into autonomous systems and interactive systems. Autonomous augmented reality systems are characterised by the fact that the user plays a secondary role, observing the system's interaction with the environment. The purpose of such systems is to provide auxiliary information about various objects. Interactive systems, on the other hand, use information input devices and allow the user to manage the interaction process independently. Augmented reality systems can also be classified according to their level of mobility:

- stationary systems operate in fixed locations (e.g., widescreen displays equipped with high-resolution cameras). Such systems partially or completely lose functionality when moved;

- mobile systems can move in space, such as smartphones and tablet computers.

In many countries, augmented reality has become an integral part of the strategy of large businesses seeking to use advanced technologies to attract new customers and partners. Additionally, augmented reality is widely employed in socially significant industries such as healthcare, education, and science. J.W. Lai & K.H. Cheong (2022) categorise current research on the use of augmented reality (AR) into two primary groups: projects focusing on the practical application of AR in specific educational contexts to introduce new innovations; and research exploring the potential of AR to assess student achievement. Examples of AR use in higher education include:

- Stanford University: employing AR to train medical students in practising complex procedures on virtual models.

- Harvard University: using AR to study history and archaeology, enabling students to “travel” to different historical eras and locations.

- UK universities: applying AR in engineering and architecture education, allowing students to visualise their projects in real time.

J. Martin-Gutierrez *et al.* (2012) highlight the possibilities of using augmented reality for students' teamwork. This is especially true when performing laboratory and practical work using dangerous equipment that requires constant monitoring by the teacher. Through the use of markers, students can use a tablet or mobile phone to display the educational material and instructions necessary for the proper use or setup of the equipment. One of the key advantages of using AR in foreign educational institutions is the ability to expand the educational environment beyond the classroom. With the help of virtual tours, students can visit any part of the world, explore cultures, and study the diversity of nature and historical events directly from their desks. This makes the learning process more accessible and engaging for students, allowing them to experience the world around them in the most realistic way possible. Interactive applications and games developed with AR technology stimulate dialogue, cooperation, and students' creative development.

For example, Japan introduced an innovative initiative to teach foreign languages, demonstrating originality in its approach. The Tokyo Shoseki Publishing Group has released English language learning materials that contain elements of augmented reality. These materials are not inferior in interactivity to typical language learning apps on an iPad screen; however, they are more accessible within the existing educational system. Readers can use their smartphone by hovering it over the relevant section of the page to hear the dialogue or even try to communicate with fictional characters.

Foreign countries are implementing VR technologies both during university studies and in on-the-job training. In the United States, AR is used to train police officers to deal with riots in certain situations. In addition, some fire departments in the United States, Australia, the United Kingdom, and other countries use the Australian FLAIM Systems platform to train firefighters. This system makes it possible to simulate dangerous situations, such as forest fires or aeroplane fires. VR realistically replicates all the fire, smoke, water, and foam of an extinguisher, as well as heat, thanks to a special thermal suit that can adjust the temperature depending on the firefighter's proximity to the virtual fire. Researchers Y. Asham *et al.* (2023) note that augmented reality (AR) and virtual reality (VR) have become among the most significant technological advances of the last decade. Their use is growing rapidly in various fields. The COVID-19 pandemic and the need for distance learning tools that mimic real-world learning environments as closely as possible have stimulated a deeper study of AR/VR tools. This proves that the use of augmented reality technology in foreign educational institutions is becoming not only an effective teaching tool but also a key factor in training specialists. This innovative practice demonstrates the potential to create a more interactive, accessible, and engaging educational environment.

Augmented reality (AR) technology is one of the most exciting innovations of contemporary time, transforming the way people interact with the world around them. Ukraine, keeping pace with global trends, is also actively utilising this technology across various fields, including business, culture, and education. Thanks to the efforts of Apple and Google, this technology can be applied in diverse areas: marketing, medicine, aviation, tourism, design, sales, and gaming. Ukrainian companies are developing AR applications and technologies for education, facilitating its adoption in the educational sector. Today, this technology is gaining increasing acceptance among teachers and scientists compared to a few years ago. Ukrainian educational institutions are gradually integrating AR technology into the educational process. Through AR, students can gain a clearer understanding of complex concepts and phenomena, thereby enhancing their comprehension of the educational material. For example, when studying biology, students can utilise AR for research. In addition, scholars V. Bykov *et al.* (2020) theoretically substantiated the methodological principles of designing educational tasks for the development of students' competencies in natural and mathematical disciplines while developing models for the use of computer modelling systems and educational tasks in competence development. O. Sokoliuk (2016) highlights the need to address the issue of integrating applications into educational content and the organisation of learning activities, as the rapid development of augmented reality (AR) technologies creates a significant gap between the opportunities they provide and the theoretical foundations necessary for their effective implementation in the educational process.

Speaking of Ukrainian developments in the educational sector, it is worth mentioning an updated mobile application with augmented reality for the Mental Arithmetic course introduced by the SMARTUM Ukraine Intelligence Development Academy. The Mental Arithmetic textbooks interact with the mobile app during training, demonstrating the correct finger placement and helping students perform the exercises accurately without requiring the coach's supervision. The textbook also includes charming illustrations for colouring, which come to life in the app and vividly shimmer with bright colours. The analysis of the essence of augmented reality technology and the content of competencies shows that the introduction of augmented reality in the educational process can effectively contribute to the formation of the following competencies: personal, technological, sensory-cognitive, research, natural and environmental, communicative, artistic and speech, artistic and creative, and digital. Thanks to the immersive experience provided by AR technology, students have the opportunity to learn subjects not only from books or screens but also to immerse themselves in virtual environments where they can experiment and interact with materials in a more dynamic way. According to the researcher I. Dymova (2022), the use of an artificial environment that is as close to real life as possible will not only eliminate external distractions

but also reduce monotony in the learning process by providing stimulating visualisation.

With the help of augmented reality tools, the educational process can be made accessible, exciting, and understandable. This technology allows educators to visually demonstrate complex processes that are difficult or impossible to reproduce in real life. It not only enables the creation of audio and video content unavailable in ordinary books but also adds live animation to the book pages, turning reading into an engaging and impressive adventure. Textbooks with augmented reality technology, educational games, training programs, visual modelling of objects and processes, as well as various applications for training skills, can become the most effective tools in education. Thus, researchers Ya. Anhelov *et al.* (2022) emphasised the enhancement of the visual capabilities of electronic (digital) textbooks through the use of interactive augmented reality objects, which contribute to the development of future teachers' competencies necessary for the successful use of AR tools in teaching. Augmented reality technology makes it possible to use virtual objects that realistically fit into the real environment, promoting the development of critical thinking and problemsolving skills. Interactive scenarios allow students to analyse situations, make decisions, and solve problems in real time. It not only strengthens theoretical knowledge but also develops practical skills, which are of great importance for the future.

Some aspects that should be taken into account when working with AR-based educational technologies were highlighted by scholars V. Tymchyna & N. Tymchyna (2020), including the insufficient professional training of teachers, dependence on the availability of AR-supported applications on smartphones for all students, and challenges related to content mobility across various platforms and devices. According to researcher S. Lytvynova (2020), the advantages of implementing augmented reality technology in the educational process include: the visualisation of educational content, which expands its scope and enables detailed study of natural processes, phenomena, or objects; creating conditions for the organisation and delivery of practical and laboratory classes in a safe environment; providing opportunities for unrestricted access to AR objects, allowing students to repeat experiments multiple times, thereby contributing to skill acquisition; developing an individualised learning trajectory that accounts for the innate abilities of students with special needs; adopting an activity-based approach as a foundation for the development of key competencies and transversal skills, thereby emphasising the practical application of theoretical knowledge; producing vivid experiences that stimulate students' cognitive activity; immersing students in virtual experiences or environments, as engaging information tends to remain in memory for longer periods; and equipping students with competencies in AR/VR/XR technologies, which are increasingly vital in many professions today.

Educational content, as noted by (Lytvynova, 2020), created with the help of augmented reality tools offers

several possibilities, including enhancing attention – students are more focused when tasks are performed independently, on their own devices, and at their own pace; activation of all senses – multisensory learning (hearing, vision, touch) improves the quality of personalised learning; increasing the efficiency of perception, understanding, and memorisation of material; developing motor skills – implementing an activity-based approach; stimulating thinking – acquiring essential skills for the 21st century. According to another researcher, N. Honcharova, the use of augmented reality technology in education enhances motivation to learn, improves information retention due to the diversity and interactivity of its visual representation, enables students to conduct parts of their research work through distance learning, improves the learning environment, and promotes the development of research skills, as well as memory, imagination, attention, thinking, and emotional intelligence (Honcharova, 2019b).

Thus, augmented reality is among the most advanced technologies for visualising educational information. Introducing this technology is expected to boost motivation to learn, improve information retention due to the diversity and interactivity of its visual representation, and allow aspects of students' research work to be shifted to the distance learning format. The use of augmented reality in the educational process can not only adapt it to the individual needs of students by providing additional resources and tasks based on their level of training and interests, but also significantly enhance the quality of education by making it more interactive, visually engaging, and accessible to diverse student groups.

CONCLUSIONS

Based on the study of the possibilities of AR technologies in the education system, it can be concluded that the development of content using augmented reality tools has significant potential to improve the effectiveness of learning and meet both the technological and content needs of students

and teachers. Primarily, it enhances the understanding of content through visualisation: AR allows students to observe and interact with learning material in three dimensions. This aids in understanding complex concepts that are difficult to explain using text or traditional two-dimensional images alone. Visual and interactive elements also contribute to better retention of information. When learners see and interact with the material, they recall it more easily later because multiple sensory channels are involved. AR makes the learning process more interesting and engaging, thereby increasing motivation to learn the material. The immersive effect creates a sense of presence, promoting deeper engagement in the learning process.

Furthermore, augmented reality can be used to create simulations of real-life situations, enabling students to acquire practical skills in a safe environment. This is particularly important for technical disciplines. AR makes learning more accessible for students with special needs by providing varied formats of information presentation and additional opportunities for adaptation. Such technologies are becoming an important component of the mobile-oriented learning environment in higher education institutions, providing modern learning conditions, modernising methods and forms, and improving the quality of education. Since augmented reality technologies are developing at an extremely rapid pace, research in the fields of education and pedagogy has not kept pace with these changes, making it difficult to theorise and develop a systematic methodology promptly. This highlights the relevance of further research aimed at developing optimal approaches to integrating traditional teaching methods with the use of augmented reality technologies.

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Ефективність використання технології доповненої реальності в навчальному процесі

Анотація. Актуальність вивчення технології доповненої реальності (AR) в освіті зумовлена стрімким розвитком цифрових технологій та необхідністю модернізації освіти. В умовах технологічної трансформації суспільства навчальні заклади повинні адаптуватися, щоб забезпечити якісну освіту, яка відповідає сучасним вимогам ринку праці. Вивчення впровадження доповненої реальності має вирішальне значення для розробки інноваційних методів та інструментів, які відповідають потребам сучасних студентів. Метою дослідження було проаналізувати технологію доповненої реальності, виокремити її види та частково розглянути можливості та переваги впровадження технологій доповненої реальності в навчальних закладах. Дослідження проводилося з використанням таких теоретичних методів, як аналіз, синтез, узагальнення та систематизація. У статті пропонувалось авторське бачення ефективності використання технології доповненої реальності в освітньому процесі на основі аналізу досліджень українських та зарубіжних науковців, які розглядають цю технологію як сучасний інструмент навчання. У ній автори аналізували класифікацію систем доповненої реальності за типом інформації, що передається, за типом приймачів, за ступенем взаємодії з користувачем та ступенем мобільності. З огляду на те, що технології доповненої реальності в освіті наразі перебувають на стадії становлення, автор представив зарубіжний та український досвід використання технологій доповненої реальності в освіті, а також окреслює можливості та переваги їх застосування в навчальному процесі. Зокрема, представлено специфіку інтеграції технологій доповненої реальності в освітній процес Стенфордського, Гарвардського університетів та університетів Великобританії. Практичне значення дослідження ефективності використання технології доповненої реальності полягає у виявленні реальних переваг та викликів, пов'язаних з її впровадженням в освітній процес. Результати дослідження сприятимуть розробці методичних рекомендацій та освітніх інструментів і додатків, які дозволять максимально розкрити потенціал доповненої реальності

Ключові слова: імерсивні технології; віртуальна реальність; візуалізація навчального матеріалу; діджиталізація освіти; змішана реальність

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The efficiency of international relations of regional higher educational institutions in a globalised context

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Abstract. In the context of globalisation, the purpose of regional higher education institutions is to provide access to education for people from all social strata and to facilitate their integration into the international arena. The primary objective was to achieve recognition and expansion of Azerbaijani higher education and regional higher education institutions in the global context. Additionally, Azerbaijani higher education aims to sign new cooperation agreements with foreign higher education institutions alongside existing collaborations. Methods of comparison, synthesis, induction, and deduction were employed in the study. The study confirmed that the international relations and strategic development plans of regional higher education institutions contribute to economic development. Furthermore, the programs implemented by these institutions have increased the number of foreign students, which improved the recognition of these regions abroad. As this is the first research study of its kind in the Republic of Azerbaijan, it will be valuable for domestic and international researchers. The conducted research, comparisons, and analyses facilitated the development of a comprehensive approach to learning theoretical concepts and models, which can be applied in teaching practices. Additionally, for foreign researchers, this study can be used as a resource for obtaining information about the regional higher education institutions in Azerbaijan, as well as their international relations, forming a foundation for further studies

Keywords: knowledge; internship programs; educational programs; innovation; student mobility; modern university

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INTRODUCTION

One of the positive aspects characterising modern Azerbaijani education is the integration into the global education arena, alignment with the European educational space, and the establishment of connections between regional higher education institutions, both in the capital and in other regions, with the world's leading universities. From the early years of independence, systematic efforts were undertaken to organise regional higher education institutions. This facilitated access to education for all social strata in these regions and surrounding areas. The economic advantages also created educational opportunities for vulnerable segments of the population, which further contributed to the recognition of these regions in the international education sphere.

The dissertation by A. Manafova (2021) highlighted the integration of the national education system into the international education system and the formation and development of the specialised education services market. This development positively impacted labour market quality, economic growth, and national competitiveness. V. Babayev *et al.* (2019) noted that globalisation and digitalisation contributed to the growth of international cooperation in education. The authors emphasised the increasing domestic and international demand for competitive education, alongside proposing measures to create a safe educational environment for international students. The authors concluded that international collaborations of



universities improve influence and promote regions in foreign markets. The authors examined the components of intercultural competence and their relationship with the self-efficacy of teachers in training students of diverse cultural backgrounds. Their findings underscored intercultural interest, stability, absence of ethnocentrism, and management of intercultural interactions as core predictors of teachers' effectiveness in multicultural environments. T. Shapiro & V. Yanovskaya (2024) argued that the dissemination of scientific outcomes amplifies the impact of innovative development, positively influencing economic growth processes. Examining internationalisation policies, X. Gong (2024) proposed a conceptual business model for inter-university campuses based on comparative analyses of foreign university campuses. The author highlighted the potential of inter-university campuses as central hubs in regional ecosystems. I. Barantsova (2023), studying intercultural dialogue in higher education, identified its significance as a crucial component of higher education, emphasising its foundation on communicative aspects. Y. Hang & X. Zhang (2023), in their research on the role of intercultural transitional competence in adaptation to internationalised campuses of students, highlighted the importance of personal development through cultural integration and interpersonal interactions. Their findings reinforced the concept of self-regulated learning, emphasising not only academic but also social adaptation. Lastly, A. Zelenková & D. Hanesová (2019), in their article addressed the growing demands on intercultural competence of university teachers due to increased international student and staff exchanges. The authors recommended systematic training programs based on the experience of Central European universities to enhance teachers' skills and meet the demands.

The study aimed to analyse the effectiveness of international relations of regional higher education institutions in the context of globalisation to identify ways of their development and integration into the international educational space.

MATERIALS AND METHODS

Various methods, including comparison, synthesis, induction, deduction, and measurement, were employed. The comparison was based on diverse criteria such as education, scientific research, internationalisation, faculty-to-student ratios, international collaboration, and career prospects, as these are critical factors considered by students during the selection of universities. A comparative analysis of Azerbaijani regional universities, including Lankaran, Ganja, and Mingachevir State Universities, was conducted. The analysis addressed the accessibility of these institutions for local populations in economic and cultural terms, collaboration with international educational organisations, dual-degree programs, educational exchange initiatives, international agreements, student mobility, and the intercultural competencies of students and faculty. The implementation and effectiveness of various programs,

including those addressing cultural differences and promoting multicultural values, were also analysed. Additionally, the study explored the strengths and weaknesses of these institutions, along with the challenges they face in achieving their goals. Recommendations for attracting more international students and creating an environment where they can showcase their cultures and share multicultural values were addressed. Efforts such as the organisation of courses, webinars, and distance education by higher education institutions (HEIs) were noted, although their implementation was found to be suboptimal in the regional HEIs studied. A wide range of data sources, including legislative acts, decrees, monographs, local and international scientific articles, dissertations, conference materials, publications, statistical databases of the Republic of Azerbaijan, educational literature, exchange programs, accreditation reports, and strategic development plans of regional universities, were analysed.

RESULTS AND DISCUSSION

The development indicator of a society and country is directly proportional to the level of education, the cultural and socio-economic development metrics of all countries and societies depend on the value placed on education. Analysing the economy of developed Western countries and their role in the political, social, and cultural arenas of the world, it is possible to note how much these states value education. Furthermore, this high priority devoted to education has directly contributed to the recognition of these states on a global scale. "The Community shall contribute to the development of quality education by encouraging cooperation between the Member States and, if necessary, by supporting and supplementing their action, while fully respecting the responsibility of the Member States for the content of teaching and the organisation of education systems and their cultural and linguistic diversity" (Maastricht Treaty, 1992). As a result of the development of science and technology, one of the positive aspects of progress in the 20th and 21st centuries is the provision of educational accessibility for all social strata. Globalisation in education, prompting the development and adaptation of national education system to the new trends in the globalised education system, thus leading to changing dynamics of the globalised world. Countries expand their educational sphere by adopting the education systems, practices, policies, and methods of other countries domestically.

In the period from 2020 to 2024, the number of foreign students studying in Azerbaijan has increased (Fig. 1). The development of any country begins primarily with the development of its regions. The culture, living standards, education level, access to education, and specialised fields of the population living in that area substantially contribute to the development of the region. The most optimal way to ensure accelerated development is to establish a higher education institution in that region. This is determined by the requirement of educated and qualified personnel for further development. The main purpose of establishing

higher education institutions is to train qualified specialists needed in that region, thereby laying the groundwork for development. After restoring its independence, Azerbaijan established several regional higher education institutions, including Ganja State University, Ganja Agrarian University, Azerbaijan University of Technology, Nakhchivan State University, Mingachevir State University, Lankaran State University, and regional branches of the Azerbaijan State Pedagogical University (Sheki, Guba, and Shamakhi branches) as well as the Zagatala branch of Azerbaijan State University of Economics (UNEC). These institutions significantly impacted the economies of the regions and their surrounding areas.

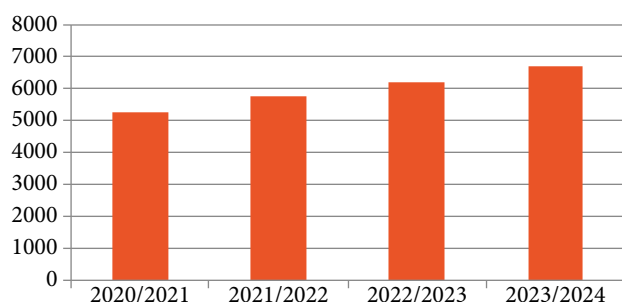


Figure 1. Number of foreign students studying in Azerbaijan (2020-2024)

Source: compiled by the author based on State Statistics Committee (2024)

The continued operation of any higher education institution (HEI) in subsequent years depends on how well it justifies its existence. Depending on competition, the demands placed on higher education, and developments in the region and the world, higher education institutions may either cease operations or prove their worth and strive. Lankaran State University (LSU), which started as an independent university in 1992 and is recognised as a regional higher education institution, had a limited number of specialisations, faculties, and students in its early years. In the following years, new faculties, departments, and specialisations were established at this regional higher education institution, and the number of students reached 5,000. The expansion of new specialities at LSU is growing day by day. This is done to further enhance the cultural development of the population by addressing the characteristics of the regional nature and the trends occurring in its economy. The “Ecology” speciality in the 2017-2018 academic year, “Information Technologies” and “Marketing” in the 2018-2019 academic year, “Horticulture and Vegetable Growing” in the 2019-2020 academic year, “Veterinary Medicine”, “Plant Protection,” and “International Trade and Logistics” in the 2020-2021 academic year, “Agricultural engineering” and “Management” in the 2021-2022 academic year, and “Horticulture and Vegetable Growing” in the 2022-2023 academic year were established in this university. In addition to the mentioned specialities, the creation of new specialities is planned. This was already a significant achievement

for a regional higher education institution. Thus, one of the aspects that distinguishes LSU from many other higher education institutions in the country is that, in addition to the bachelor’s degree programs, it also operates departments for other levels of education, such as master’s and PhD (dissertation) programs. Following the requirements of “the State Program on Increasing the International Competitiveness of the Higher Education System in the Republic of Azerbaijan for 2019-2023” the implementation of a dual-degree program is also done at LSU (Reforms iHigher Educationon, 2013). “In 2019, a Dual-Degree Program agreement was signed between UNEC and LSU. Students studying in full-time education in the partner universities’ specialties of “Economics”, “Business Administration”, “Accounting and auditing”, and “Finance” will participate in the program” (Natiq Ibrahimov, 2023). The goal is to ensure cooperation between universities, student-teacher exchange, and the graduation of highly qualified students per the requirements of the labour market. “Students can participate in the international exchange and dual-degree programs of the partner university. LSU students also benefit from the dual-degree programs offered by UNEC in collaboration with Montpellier University in France and other renowned foreign universities” (UNEC News, 2019).

In addition, agreements regarding the establishment of dual degrees between Lankaran State University and Kaposvar University in Hungary and Kafkas University in Turkey were signed. One of LDU’s areas is cooperation with prestigious higher education institutions within the country and globally to achieve high rankings in national and international rankings. The directions reflecting HEIs’ internationalisation policies are outlined in the fourth section, titled “International Cooperation and the Internationalisation of Academic Activities”, in the Strategic Development Plan of Lankaran State University. This document covers the years 2022-2030 (Accreditation Report, 2023). To develop its international relations, an International Cooperation Department and an International Language Centre were also established. The international relations of the university include bilateral cooperation with higher education institutions abroad, student-teacher exchange, participation in international education programs, collaboration with various regional and international organisations, projects, etc. This higher education institution is a member of the Association of Caucasus Universities and the Eurasian Universities Association. Within the framework of international cooperation, it collaborates with organisations such as the British Council (United Kingdom), DAAD (Germany), CAMPUS (France), ERASMUS+, and others, implementing various projects. Within the framework of these projects, connections were established with universities in France, the United Kingdom, Italy, Germany, Poland, Hungary, Spain, and other countries. Currently, it is an active participant and partner in several international projects within the Erasmus+ KA2 program (capacity building in higher education). In the coming years, LSU plans to sign new cooperation agreements with renowned

higher education institutions to expand its relations with foreign HEIs. This also includes the involvement of foreign faculty in the teaching process. This is regarded as one of the factors ensuring the quality of education and is aimed at increasing competitiveness in the job market (Jung-Cheng Chen *et al.*, 2024; Jiexiu *et al.*, 2024).

As a regional higher education institution, one of the objectives of LSU is to increase the number of foreign students. To achieve this, LSU will implement new programs that enable more foreign students to study at all levels of higher education based on the signed agreements. In this regard, the university collaborates with international organisations such as Campus Global, Aran Academy, Yoshe-def and Istanbul-study agencies, also participating in International Education exhibitions. At the same time, it is a member of the Association of Caucasus Universities, the Caspian Universities Association, and the Eurasian Universities Union. It also collaborates with universities such as Sinop University, Amasya University, Kastamonu University, Kocaeli University, Artvin Çoruh University, Igdir University, Kafkas University, Sakarya University in Turkey, Leon University in Spain, and the University of Warmia and Mazury in Poland, and others.

LSU aims to send university staff, and young researchers, such as master's, PhD, and dissertation candidates to research centres in leading universities of various countries for training, at the same time, to invite foreign specialists to benefit from their experience and to conduct training sessions for local experts. In the context of globalisation, studying and internships in international education programs are crucial in shaping the future goals of LSU students. This process is further accelerated by collaboration between countries, the rapid development of information technologies, and other factors. Although opportunities for studying abroad have increased in recent years, most prestigious universities allow their students to intern at the world's leading companies during their studies. This has been set as a goal for LSU. Internship in foreign countries improves professional knowledge, provide career experience, and establish professional relationships for individuals of all ages, both individually and in team settings. International experience provides graduates an advantage over other candidates when applying for jobs in the future, ensuring a competitive edge. Most graduates who have interned abroad and possess foreign language skills acquire professional and technical competencies in their fields and can learn personal strengths and weaknesses in their specialisation, allowing them to prioritise their skills on specific goals. Students also can learn from their mistakes, developing skills such as gradual approach to success, professional conduct, and self-confidence. On the other hand, an international internship familiarises students with different cultures and provides the chance to meet people from various nationalities. Additionally, the participation of university staff and students in various international projects is substantial in achieving the goals set by the university. The significance of LSU in the

development of the Lankaran-Astara economic region is considerable. The creation of new knowledge, along with the formation, utilisation, and export of products and services, will bring all sectors of the economy in the region to a global standard.

One of the major regional higher education institutions operating in the country is Ganja State University. This higher education institution, established in 1938 as a Teachers' Institute, was named Ganja State University in 2000. Given the accessibility of higher education for the population of the area and surrounding regions, the university has broadened its scope and now trains highly qualified specialists across various fields, aligning with current-day demands and the market economy.

Meeting the needs of the regional population and various sectors of its economy, new faculties and specialties were established every year. Currently, the following faculties operate at GSU: Chemistry-Biology, Mathematics-Computer Science, Physics and Technical Sciences, Pedagogy, History-Geography, Foreign Languages, Economics-Management, and Philology. Additionally, a Master's and a Correspondence Education Department is also in operation at GSU. To support the regional economy, an "Innovations Department" was also established at the university. This department includes the following departments: Transfer and Marketing of Innovation Technologies, Strategic Analysis, Evaluation and Monitoring, Formation of Information Resources, Project Management, Intellectual Property, Information and Communication Technologies, International Relations, and Publishing. In addition, there are 31 departments, 15 divisions, 8 centres, and 1 research laboratory operating. Currently, 7,184 students are enrolled in bachelor's programs, 453 in master's programs, 70 in dissertation programs, and 56 in PhD programs (Chentukov & Marena, 2020; Petrychenko, 2023).

Alongside cooperation with domestic higher education institutions, collaborating with foreign higher education institutions and participating in various programs is one of the priority directions for GSU. Ganja State University (GSU), has active bilateral agreements with Urbino in Italy, Nova Gorica in Slovenia, Galati in Romania, Debrecen in Hungary, as well as universities in Spain and the Kingdom of the Netherlands, and Gazi and Sivas Universities in the Republic of Turkey, conducts bilateral cooperation. This higher education institution, based on existing agreements, is cooperating in areas such as internships, organising scientific conferences, student-teacher and scientific information exchanges, etc. Ganja State University has even broader relations with higher education institutions in Turkey. The "German Academic Exchange Service" (DAAD) is considered the world's largest scholarship organisation, facilitating the international exchange of students and researchers. Ganja State University continues its relations with the organisation. In the framework of this cooperation, the university participates in several internship programs in Germany. Ganja State University has set the goal of further strengthening international relations in

the coming years and implementing several projects to provide modern educational opportunities for students.

GSU has developed a special Strategic Plan to achieve its future goals and strategic objectives (Action Plan, 2023). Strategic Plan outlines the following goals, corresponding strategic objectives, and directions for strategic activities aimed at achieving these objectives: support of the selection of proper management and evaluation methods to improve educational programs, application of educational technologies to enhance the quality of teaching and learning, advancements in scientific researches, integration into the global scientific community, development of scientific and intellectual potential, support of the development of innovation and entrepreneurship, establishment and improvement of a modern management system, promotion of sustainable development, inclusivity development, equitable, and accessible quality education for all and supporting life-long learning opportunities, improvement of the quality assurance system and aligning processes with modern standards and guidelines etc (Takaharu, 2022; Knight, 2024).

One of the prominent regional higher education institutions in Azerbaijan is Mingachevir State University (State Program on Reforms..., 2009). Established as a branch of various higher education institutions in 1991 and later as an independent institution, this regional institution has existed under the name of Mingachevir State University since 2015. In a short period, this higher education institution has achieved significant success at the national and regional levels and has begun attracting students in various fields of study. Corresponding with the continuously expanding trends in the Azerbaijani higher education system in recent years, foreign relations of MSU continue to grow. Currently, at MSU, training is conducted for bachelor's degrees in 38 specialties and master's degrees in 20 specialties within the fields of economics, engineering, and education. More than 3,500 undergraduate and graduate students study across 3 faculties and 10 departments. The university also hosts a Research Centre for Sustainable Development and Regional Innovations (Action plan on the basis..., 2016).

The international relations policy of Mingachevir State University is implemented within the framework of bilateral cooperation. This includes participation in large-scale educational programs, attraction of foreign students to the university, dual certification of degree, collaboration with international institutions, organisation of joint summer schools, etc. It is also planned to organise scientific conferences and seminars, as well as to conduct mutually beneficial exchanges of experience. Hereby, within the framework of developing international relations, the university has signed cooperation protocols with Turkey's Gazi University, Yildiz Technical University, KTO Karatay University, and Istanbul Gedik University (MSU, 2022; Office of international..., 2023). Furthermore, a memorandum of cooperation was signed between Mingachevir State University and the Kyiv National University of Economics, as well as the Kyiv National University of Technologies and Design (KNUTD). The memorandum has initiated the GEOCLIC project, titled "New Courses in Geospatial Engineering for

Climate Change Adaptation of Coastal Ecosystems", within the framework of the Erasmus+ program. In this three-year program, higher education institutions from Azerbaijan, Germany, the Netherlands, Lithuania, Kazakhstan, Romania, and Turkmenistan have participated as partners. Additionally, the memorandum envisions scientific and cultural collaboration following the educational policies of both universities. Universities prioritise joint participation in international grant programs such as Erasmus+ and Horizon Europe. Potential areas of collaboration, including student and faculty exchanges within an academic framework, are also emphasised. Furthermore, it is planned to develop and implement educational programs, conduct scientific research, and organise scientific conferences, forums, and other events (KNUTD, 2021).

In recent years, HEI operating in the regions of the Republic of Azerbaijan have set the goal of becoming international universities and the main trends in this regard are as follows: attraction of international students, provision of participation in international exchange programs, establishment of international dual-degree programs, development of education programs in foreign languages, strengthening of academic opportunities, alignment of education programs with international practices, enhancement of international competitiveness.

CONCLUSIONS

The research on the internationalisation policies of regional higher education institutions concluded that in recent years, new programs were implemented to attract foreign students. As a result of these programs, the number of foreign students coming to the country has increased, and the internal recognition of these regions was also noted. Online courses, the involvement of foreign lecturers, and other initiatives were proposed as part of the strategy. The research confirms that the internationalisation policies and strategies of regional higher education institutions have contributed to economic development. The policy of attracting foreign students and staff, as well as the strategies adopted by regional institutions in the context of increasing recognition of Azerbaijan's regional higher education in the international arena, were highlighted. These strategies include international partnerships, the development of academic and auxiliary services for foreign students, and the improvement of the appeal of higher education for international students.

The first fundamental strategy of internationalisation is to increase the attractiveness of foreign students. Therefore, the main objectives for Azerbaijani regional higher education institutions include attraction of students and professors from renowned foreign universities, improving the recognition and expansion of Azerbaijani higher education in the international arena, signing new cooperation agreements with foreign universities in addition to existing collaborations, increasing the potential for teaching in English alongside the native language, training highly qualified personnel for international foreign relations, and establishing appropriate departments for foreign collaborations at regional institutions. The study also highlighted

the need to establish permanent delegations of specialists fluent in foreign languages for visits to partner countries, the creation of an international cooperation office, and a centre for foreign students. These directions are prioritised, and further development of these efforts is planned.

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CONFLICT OF INTEREST

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Ефективність міжнародних зв'язків регіональних вищих навчальних закладів в умовах глобалізації

Анотація. В умовах глобалізації метою регіональних вищих навчальних закладів є забезпечення доступу до освіти для людей з усіх соціальних верств і сприяння їхній інтеграції в міжнародний простір. Першочерговим завданням було досягнення визнання та розширення азербайджанської вищої освіти та регіональних вищих навчальних закладів у світовому контексті. Крім того, азербайджанська вища освіта прагне підписати нові угоди про співпрацю з іноземними вищими навчальними закладами на додаток до існуючої співпраці. У дослідженні були використані методи порівняння, синтезу, індукції та дедукції. Дослідження підтвердило, що міжнародні зв'язки та стратегічні плани розвитку регіональних закладів вищої освіти сприяють економічному розвитку. Крім того, програми, реалізовані цими закладами, збільшили кількість іноземних студентів, що покращило впізнаваність цих регіонів за кордоном. Оскільки це перше дослідження такого роду в Азербайджанській Республіці, воно буде цінним для вітчизняних та міжнародних дослідників. Проведені дослідження, порівняння та аналіз сприяли розробці комплексного підходу до вивчення теоретичних концепцій і моделей, які можуть бути застосовані у практиці викладання. Крім того, для іноземних дослідників це дослідження може бути використано як ресурс для отримання інформації про регіональні вищі навчальні заклади Азербайджану, а також про їхні міжнародні зв'язки, формуючи основу для подальших досліджень

Ключові слова: знання; програми стажування; освітні програми; інновації; студентська мобільність; сучасний університет

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System of comprehensive evaluation of academic staff activity

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Abstract. Universities evaluate the activities of academic staff annually to encourage excellence in performance and to develop training programmes to enhance their professional skills. The evaluation of academic staff activities is mainly based on the results of their scientific work, but it is important to take into account other areas of their responsibilities. Therefore, the purpose of the study was to develop a system for the comprehensive evaluation of academic staff, which would consider the outcomes of their pedagogical, methodological, scientific, and organisational work. The method employed involved the analysis of university regulatory documents that define academic staff evaluation systems. Graphs were utilised to model the structure of the relationships between the criteria of the proposed evaluation system. The evaluation system determines the indices of academic staff work efficiency both for individual types of activities and comprehensively. According to the system, the outcomes of all academics are compared with the best results achieved in the current year at the university or national level. The calculations of the comprehensive index of activity efficiency for each academic enable the formation of university, faculty, and departmental rankings of academic staff, as well as the categorisation of performance levels based on the proposed scale. It was recommended that the evaluation results be presented in academic portfolios on the university website to ensure transparency. This approach also enables stakeholders to track changes in academics' effectiveness over time. The evaluation system will enhance personnel management in universities, thereby contributing to the achievement of strategic goals for institutional development. The proposed academic staff evaluation system can be implemented at both the university and national levels. Its implementation will further foster a competitive environment among academics at the national, university, faculty, and departmental levels

Keywords: teachers and research staff evaluation; evaluation criteria; academic efficiency; teacher ranking; academic portfolio

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INTRODUCTION

Staff evaluation is an important element of human resource management, centred on determining the alignment between staff performance indicators, their characteristics,

and the requirements of the positions they hold. As employees possess varying levels of knowledge, skills, and abilities, they accordingly perform their job duties with



differing levels of efficiency. To develop an effective system for motivating all employees (from high performers to those with lower levels of achievement), it is necessary to evaluate their performance. Consequently, the development of an objective and flexible system for the evaluation of academic staff in universities is essential. Such a system would enable the creation of a fairer and more effective approach to their motivation and foster a competitive environment among academics.

In the modern era, educational institutions play a critical role in producing a high-quality national education system capable of competing globally (Kadiyono *et al.*, 2020). Public higher education institutions face significant pressure to improve their performance and quality by increasing the number of publications, citations, and graduates, while also ensuring the efficient use of public resources (Ramírez-Gutiérrez *et al.*, 2020). M. Jedemark & M. Londos (2021) observed that various efforts have been made in higher education to meet the growing demand for more transparent governance and enhanced efficiency and quality. According to O. Anyanwu (2021), the effectiveness of a university's activities is primarily determined by the extent to which academics meet the requirements of their positions. Universities can only achieve their development goals with highly qualified academic staff. The degree of compliance of academic staff with position requirements can be assessed through performance evaluations, which are among the key functions of personnel management. Personnel management in universities involves leveraging the results of academic evaluations to identify top performers and to create opportunities for their professional development, as academics must engage in professional learning throughout their careers (Garner & Kaplan, 2021). Evaluations also enable university management to identify underperforming and poorly qualified academics.

The evaluation of academics' performance is a complex issue because it involves multiple criteria. As noted by M. Popović *et al.* (2020), evaluation outcomes are significantly influenced by the choice of criteria, their values, and the weights assigned to them. The efficiency evaluation of academic staff relies on both objective data and subjective survey results. According to the Law of Ukraine No. 1556VII (2014), the university system for ensuring the quality of higher education must include the annual evaluation of academic staff and the regular publication of evaluation results on the university website. Universities have the autonomy to select the criteria for academic evaluation and to assign scores to various types of activities (Yaroshenko, 2021). However, university administrations are often guided by their own perceptions of the importance of each criterion. Thus, the development of a comprehensive system for evaluating academic staff activities is a crucial issue for university management, as the successful implementation of university strategies depends on it.

According to the Law of Ukraine No. 1556-VII (2014), the working time of academics encompasses pedagogical, methodological, scientific, and organisational activities. At

the same time, W. Wahyudi (2022) stated that academics have three main tasks: providing quality teaching, conducting research to contribute to progress, and offering community service as an application of teaching and research. Despite the diversity of responsibilities, the career progression of academics depends primarily on the outcomes of their scientific work. K. Paudel (2021) emphasised the importance of research quality and the number of articles published in high-ranking indexed journals in measuring academic staff performance. To achieve prominent positions in the highly competitive university environment, key components of academic staff responsibilities include active publication of research articles and maintaining high performance and quality in research activities.

D. Maisano *et al.* (2023) found that the policies of most higher education institutions prioritise research over teaching. Such university strategies, coupled with academic staff evaluation systems that predominantly focus on scientific achievements, can hinder creativity and innovation in teaching. It is evident that when teaching effectiveness carries limited weight in evaluation systems, academics are likely to dedicate more effort to areas deemed more significant in evaluations, rather than enhancing their pedagogical skills (Wan & Jin, 2021). Therefore, the criteria for evaluating the professional activities of academic staff should ensure the assessment of not only research but also pedagogical and community engagement, as well as ethical interactions with colleagues, students, and university administrators. Moreover, when developing academic staff evaluation criteria, it is essential to adhere to the requirements of the Resolution of the Cabinet of Ministers of Ukraine No. 1187 (2015).

A specific evaluation process for academic staff necessitates selecting an appropriate method tailored to the university's actual needs. According to X. Zhang *et al.* (2021), a variety of evaluation methods are employed to assess academic staff, which can be broadly categorised as qualitative, quantitative, or comprehensive approaches that combine both. The evaluation of academics based on these criteria should support the development of leadership potential, enhance the efficiency of their activities, and motivate them toward innovation and professional growth. This, in turn, will contribute to the formation of a high-quality academic staff. Additionally, it is advisable to review and approve the evaluation criteria and weighting coefficients for each type of academic activity annually, in line with the university's needs to improve its ranking.

Y. Mao *et al.* (2024) noted that the value of student evaluation of teaching lies not only in its immediacy but also in its rich information content, which encompasses teaching style, methodology, and attitude; the difficulty level and practicality of course content; areas of strength and weakness in teaching activities; and students' learning needs and expectations. The results of such evaluations can help academics better address students' needs and improve teaching effectiveness. A. Naumann *et al.* (2020) stated that student feedback is only one element in evaluating teaching

effectiveness. Another important criterion is student achievement, which can be assessed in various ways, such as through grades, standardised tests, and other measures. A. Fajčíková & M. Fejfarová (2019) found that students' perceptions of a course are most influenced by its usefulness and interest level, clarity and logical structure, and the lecturer's ability to explain and teach effectively.

S. Rafiq & S. Qaisar (2021) pointed out that academics should consider the results of their performance evaluations and strive to improve their teaching practices. University administration should support this by offering professional development courses targeting areas identified as weak in evaluations. Additionally, academics in high-ranking positions need to receive financial rewards based on evaluation results. As indicated by C. Wan & F. Jin (2021), the disadvantages of evaluation systems can include poor organisation, unqualified evaluation teams, lack of transparency and fairness in the process, and insufficient analysis of results and feedback. To encourage academic staff to support professional activity evaluations, it is essential to establish and approve clear implementation requirements and provide avenues for appeals. Evaluations should be transparent, reliable, comprehensive, and flexible, allowing for adjustments to weighting factors based on university priorities.

It is advisable to compare evaluation results separately for professors, associate professors, and assistants. Furthermore, evaluation systems should reflect the specific characteristics of the disciplines in which academics work. E. Zhang & W. Shi (2019) highlighted that academics in fields such as fine arts and design are less involved in scientific research and writing and are primarily engaged in creative activities. Therefore, artistic achievements should be incorporated into evaluation criteria. Evaluation results must be made publicly accessible, as mandated by Ukrainian legislation. V. Smirnova (2021) recommends that to ensure the transparency of university activities and foster healthy competition among academic staff, universities should publish academics' portfolios on their websites. These portfolios should include key indicators of professional activity, biographical details, selected publications, links to scientometric database profiles, citation metrics, and contact information.

Differences in evaluation methods across universities hinder comparisons of individual academics' indicators. Consequently, there is an urgent need to develop a comprehensive evaluation system for academic staff activities that can be applied across higher education institutions. The purpose of this study was to develop such a system for comprehensive evaluation in higher education institutions.

MATERIALS AND METHODS

The evaluation systems for academic staff at the following universities were analysed: Lutsk National Technical University, Lviv Polytechnic National University, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", National Aerospace University – "Kharkiv Aviation Institute", V.N. Karazin Kharkiv National

University, Sumy State Pedagogical University named after A.S. Makarenko, and Odesa National University of Technology. P. Apodaca & H. Grad (2005) and S. Deng & X. Que (2018) proposed criteria for student evaluation of teaching activities, which were incorporated into the formation of a comprehensive evaluation system for academic staff activities. Y. Yan *et al.* (2010) proposed a teacher rating scale of A, B, C, D, and E, which was considered during the development of the rating scale for the comprehensive evaluation system.

A graph was used to capture relationships between criteria at different levels of the evaluation system. A graph is composed of a set of nodes connected by lines (Koutrouli *et al.*, 2020). The graph for the comprehensive evaluation system contains six levels: zero, first, second, third, fourth, and fifth. This graph reflects the multi-level hierarchical structure of the criteria for assessing the effectiveness of academics' activities. At the zero level, there is a comprehensive criterion for evaluating the performance of academic staff. At the first level, the graph includes comprehensive criteria for the effectiveness of academic staff categorised by the main types of activities. At subsequent levels, the graph includes subcriteria of these comprehensive criteria. In the comprehensive evaluation system, the effectiveness of academics' activities for each criterion is quantified using a relative index:

$$Q_i = m_i \frac{P_i}{P_{bi}}, \quad (1)$$

where Q_i is the relative index characterising the effectiveness of academic staff according to criterion i ; m_i is the weighting coefficient of criterion i ; P_i is the index representing the effectiveness of academics' activities according to criterion i in the current year; and P_{bi} is the base index for criterion i in the current year. The base index P_{bi} represents the best result achieved by academic staff in the current year for the given criterion. The base index is determined separately for professors, associate professors, and assistant professors. When calculating indices Q_p , the importance of each type of activity (criterion) is incorporated through the weighting coefficients m_p , the values of which are determined by the university administration based on its strategic objectives. The sum of weighting coefficients within each group and subgroup of criteria is equal to 1:

$$\sum_{i=1}^n m_i = 1, \quad (0 < m_i < 1), \quad (2)$$

where n is the number of criteria in the criteria group.

RESULTS AND DISCUSSION

The system for the comprehensive evaluation of academics' activity at the university includes grouped criteria, the relationships among which are represented in the form of a graph, parts of which are shown in Figures 1-5. Taking into account all the criteria, the comprehensive index of the effectiveness of academics' activity Q (zero level of the graph – Fig. 1) is calculated using equation (3):

$$Q = Q_1 + Q_2 + Q_3 + Q_4, \quad (3)$$

where Q_1 is the comprehensive index that considers the evaluation of the pedagogical activity of academics based on the group of criteria in Table 1; Q_2 is the comprehensive index that considers the evaluation of the methodological activity of academics based on the group of criteria in Table 2; Q_3 is the comprehensive index that considers the evaluation of the scientific activity of academics based on the group of criteria in Table 3; Q_4 is the comprehensive index that considers the evaluation of the organisational activity of

academics based on the group of criteria in Table 4. Comprehensive criteria for the pedagogical, methodological, scientific, and organisational activity of academic staff are placed on the first level of the graph (Fig. 1). These are characterised by the corresponding comprehensive indices Q_1, Q_2, Q_3, Q_4 .

The comprehensive index of the effectiveness of pedagogical activity Q_1 considers the results of the evaluation of academics based on the criteria presented in Table 1 and is calculated using Equation (4):

$$Q_1 = m_1(Q_{1.1} + Q_{1.2} + Q_{1.3}), m_1 + m_2 + m_3 + m_4 = 1. \quad (4)$$

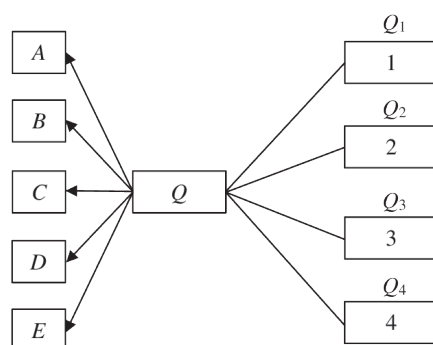


Figure 1. Part of the graph (zero and first levels) of the comprehensive evaluation system of academic staff

Source: developed by the author

Table 1. Criteria for evaluating the pedagogical activity of academics

Graph level 2	Graph level 3	Graph level 4
$P_{1.1}$ Teaching load (number of hours for teaching or supervision)	$P_{1.1.1}$ Lectures	
	$P_{1.1.2}$ Practical or laboratory classes	
	$P_{1.1.3}$ Final qualifying works of students	$P_{1.1.3.1}$ Bachelor's level
		$P_{1.1.3.2}$ Master's level
		$P_{1.1.3.3}$ PhD level
	$P_{1.1.4}$ Work in examination commissions	$P_{1.1.4.1}$ University conducting the evaluation
		$P_{1.1.4.2}$ Other universities
	$P_{1.1.5}$ Practice supervision	
	$P_{1.1.6}$ Student coursework or project	
$P_{1.2}$ Results of the student survey	$P_{1.2.1}$ Course planning	$P_{1.2.1.1}$ Informing students about the course programme
		$P_{1.2.1.2}$ Course programme compliance
		$P_{1.2.1.3}$ Informing students about the criteria, forms and timing of assessment of learning outcomes
	$P_{1.2.2}$ Preparing for class	$P_{1.2.2.1}$ Teacher readiness to teach
		$P_{1.2.2.2}$ Level of expertise
		$P_{1.2.3.1}$ Clarity of explanations
	$P_{1.2.3}$ Ability to communicate, teach and interact with students	$P_{1.2.3.2}$ Focus on key issues
		$P_{1.2.3.3}$ Respect for students' questions and suggestions
		$P_{1.2.3.4}$ Encouraging classroom activity
		$P_{1.2.3.5}$ Encouraging student research and critical thinking skills
		$P_{1.2.4.1}$ Theoretical material supplemented with examples, etc.
	$P_{1.2.4}$ Didactic and methodical aspects	$P_{1.2.4.2}$ Usefulness of recommended supplemental materials
		$P_{1.2.4.3}$ Use of modern information and communication technologies
		$P_{1.2.5.1}$ Applying the grading criteria outlined in the syllabus
	$P_{1.2.5}$ Assessing student learning	$P_{1.2.5.2}$ Objectivity of assessment

Table 1. Continued

Graph level 2	Graph level 3	Graph level 4
	$P_{1.3.1}$ Passing the exam	
$P_{1.3}$ Student learning outcomes (grades/score/level)	$P_{1.3.2}$ Defending coursework or project	
	$P_{1.3.3}$ Defending final qualifying works	$P_{1.3.3.1}$ Bachelor's level
		$P_{1.3.3.2}$ Master's level
		$P_{1.3.3.3}$ PhD level
	$P_{1.3.4}$ Defending practice report	

Source: developed by the authors

For example, the calculation of the comprehensive index $Q_{1.1}$ or the group of sub-criteria 1.1 at all levels of the graph can be performed using equations (1) and (2), taking into account the connections among the sub-criteria shown in Fig. 2:

- the second level of the graph:

$$Q_{1.1} = m_{1.1} (Q_{1.1.1} + Q_{1.1.2} + Q_{1.1.3} + Q_{1.1.4} + Q_{1.1.5} + Q_{1.1.6}),$$

$$m_{1.1} + m_{1.2} + m_{1.3} = 1.$$

- the third level of the graph:

$$Q_{1.1.1} = m_{1.1.1.1} \frac{P_{1.1.1.1}}{P_{61.1.1.1}}, Q_{1.1.2} = m_{1.1.2} \frac{P_{1.1.2}}{P_{61.1.2}},$$

$$Q_{1.1.3} = m_{1.1.3} \left(m_{1.1.3.1} \frac{P_{1.1.3.1}}{P_{61.1.3.1}} + m_{1.1.3.2} \frac{P_{1.1.3.2}}{P_{61.1.3.2}} + m_{1.1.3.3} \frac{P_{1.1.3.3}}{P_{61.1.3.3}} \right),$$

$$Q_{1.1.4} = m_{1.1.4} \left(m_{1.1.4.1} \frac{P_{1.1.4.1}}{P_{61.1.4.1}} + m_{1.1.4.2} \frac{P_{1.1.4.2}}{P_{61.1.4.2}} \right),$$

$$Q_{1.1.5} = m_{1.1.5} \frac{P_{1.1.5}}{P_{61.1.5}}, Q_{1.1.6} = m_{1.1.6} \frac{P_{1.1.6}}{P_{61.1.6}},$$

$$m_{1.1.1} + m_{1.1.2} + m_{1.1.3} + m_{1.1.4} + m_{1.1.5} + m_{1.1.6} = 1,$$

$$m_{1.1.3.1} + m_{1.1.3.2} + m_{1.1.3.3} = 1, m_{1.1.4.1} + m_{1.1.4.2} = 1.$$

For all groups of sub-criteria at all levels of the graph, calculations are performed similarly.

For the group of sub-criteria 1.1, the values of $P_{1.1.i}, P_{1.1.i.k}$ correspond to the number of hours dedicated to a specific academic activity (e.g., lectures, practical classes) in the annual teaching load. The values of $P_{b1.1.i}, P_{b1.1.i.k}$ represent the maximum number of hours allocated to that activity at the university for the current year. For instance, in the annual teaching load for an associate professor, the number of lecture hours in the current year is $P_{1.1.1} = 110$ hours, and the maximum number of lecture hours for associate professors in the current year is $P_{b1.1.1} = 160$ hours.

It is advisable to conduct a survey among students to evaluate academics' activity according to the group of sub-criteria 1.2 using a five-point scale, where 1 point represents the lowest rating and 5 points the highest. For the group of sub-criteria 1.2, the values of $P_{1.2.i}, P_{1.2.i.k}$ represent the average scores assigned by students to a particular teacher for each sub-criterion, while the values of $P_{b1.2.i}$ and $P_{b1.2.i.k}$ are equal to 5. For example, based on the results of the student survey, a teacher received an average score of $P_{1.2.3.1} = 4.3$ for the sub-criterion " $P_{1.2.3.1}$ Clarity of explanations", where the maximum possible score is $P_{b1.2.3.1} = 5$. For the group of sub-criteria 1.3, the values of $P_{1.3.i}$ and $P_{1.3.i.k}$ correspond to the average number of points obtained by

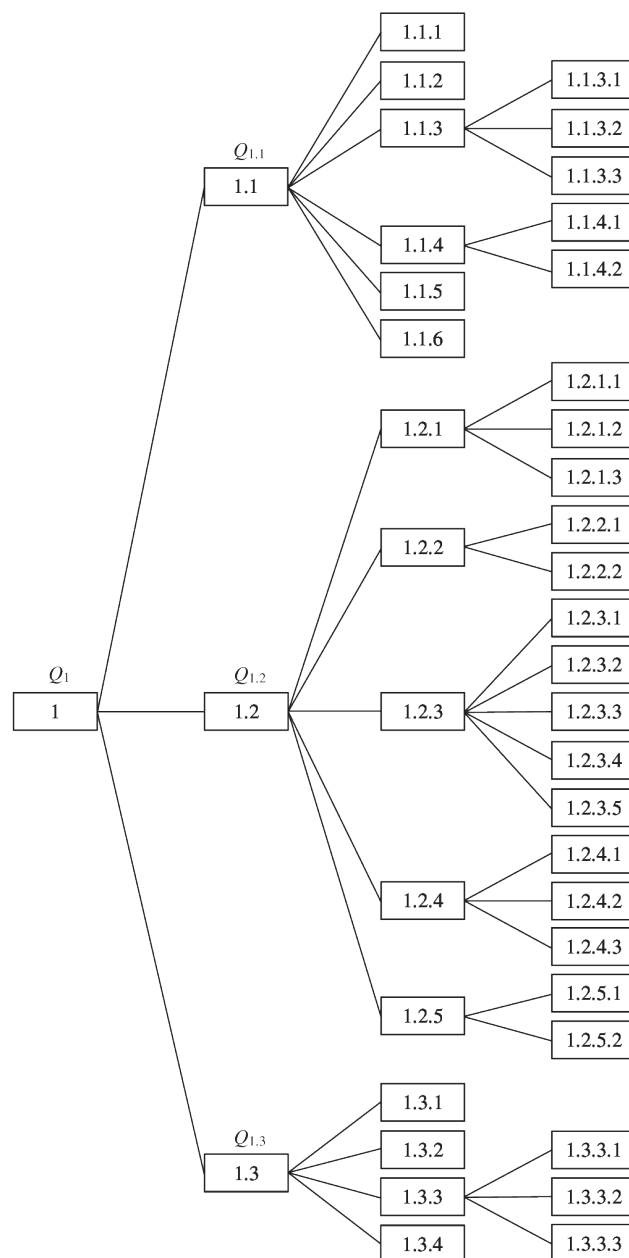


Figure 2. Part of the graph (first, second, third, and fourth levels) shows criteria for evaluating the pedagogical activity of academics

Source: developed by the authors

students in the teacher's course or during the defence of coursework/projects. If the university evaluates student learning outcomes on a 100-point scale, $P_{b1.3.i}$ and $P_{b1.3.i,k}$ are equal to 100 points. If a PhD student successfully defends a thesis under the supervision of an academic, the indices have the values $P_{1.3.3.3} = 1$, $P_{b1.3.3.3} = 1$. If the thesis is not de-

fended, the index is $P_{1.3.3.3} = 0$. The comprehensive index of the effectiveness of methodological activity Q_2 takes into account the evaluation results based on the criteria presented in Table 2 and is calculated using equation (5):

$$Q_2 = m_2(Q_{2.1} + Q_{2.2} + Q_{2.3} + Q_{2.4} + Q_{2.5} + Q_{2.6} + Q_{2.7}). \quad (5)$$

Table 2. Criteria for evaluating the methodological activity of academics

Graph level 2	Graph level 3	Graph level 4
$P_{2.1}$ Preparing pedagogical and methodological publications	$P_{2.1.1}$ Textbooks, particularly electronic	$P_{2.1.1.1}$ In national language $P_{2.1.1.2}$ In a foreign language
	$P_{2.1.2}$ Training manuals, workshops, etc., particularly electronic	$P_{2.1.2.1}$ In national language $P_{2.1.2.2}$ In a foreign language
	$P_{2.1.3}$ Lecture notes, particularly electronic	$P_{2.1.3.1}$ In national language $P_{2.1.3.2}$ In a foreign language
	$P_{2.1.4}$ Recommendations for conducting classes, courses, etc.	$P_{2.1.4.1}$ In national language $P_{2.1.4.2}$ In a foreign language
$P_{2.2}$ Preparing regulatory filings	$P_{2.2.1}$ Educational programme development	$P_{2.2.1.1}$ Bachelor's level $P_{2.2.1.2}$ Master's level $P_{2.2.1.3}$ PhD level
		$P_{2.2.2.1}$ Bachelor's level $P_{2.2.2.2}$ Master's level $P_{2.2.2.3}$ PhD level
		$P_{2.2.3.1}$ Bachelor's level $P_{2.2.3.2}$ Master's level $P_{2.2.3.3}$ PhD level
	$P_{2.2.3}$ Education plan development	$P_{2.2.4.1}$ Bachelor's level $P_{2.2.4.2}$ Master's level $P_{2.2.4.3}$ PhD level
	$P_{2.2.4}$ Work plan development	
	$P_{2.2.5}$ Curriculum development	
	$P_{2.3.1}$ Examination tasks	
$P_{2.3}$ Developing student assessment tasks	$P_{2.3.2}$ Modular control tasks	
	$P_{2.3.3}$ Final certification tasks	
$P_{2.4}$ Developing and implementing new teaching methods	$P_{2.3.4}$ Entrance exam tasks	
$P_{2.5}$ Participating in pedagogical and methodological activities	$P_{2.5.1}$ Department level	
	$P_{2.5.2}$ University level	
	$P_{2.5.3}$ National level	
	$P_{2.5.4}$ International level	
$P_{2.6}$ Conducting open lectures	$P_{2.6.1}$ At the university conducting the evaluation	
	$P_{2.6.2}$ At other universities	$P_{2.6.2.1}$ Ukraine $P_{2.6.2.2}$ Other countries
$P_{2.7}$ Reviewing pedagogical and methodological publications	$P_{2.7.1}$ National publications	
	$P_{2.7.2}$ International publications	

Source: developed by the author

For all groups of sub-criteria used to evaluate the methodological activity of academics (Fig. 3), the indices $Q_{2.i}$ are calculated using equations (1) and (2), taking into account the connections among the sub-criteria.

For the group of sub-criteria 2.1, the values of $P_{2.1.i,k}$ are equal to the number of pedagogical and methodological publications, including electronic publications, prepared and published in the current year. If the publications have multiple authors, it is advisable to calculate the number of publications using equation (6):

$$P_{2.1.i,k} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3} + \dots, \quad (6)$$

where $n_1, n_2, n_3, \dots$ is the number of authors for each pedagogical and methodological publication (1, 2, 3, etc.).

The value of $P_{b2.1.i,k}$ is the maximum number of pedagogical and methodological publications prepared by a university teacher (professor, associate professor, or assistant) in the current year.

For the group of sub-criteria 2.2, the values of $P_{2.2.i}$ and $P_{2.2.i,k}$ correspond to the number of regulatory filings pre-

pared in the current year. The values of $P_{b2.2.i}$ and $P_{b2.2.i.k}$ represent the maximum number of regulatory filings prepared

by a teacher (professor, associate professor, or assistant) in the current year.

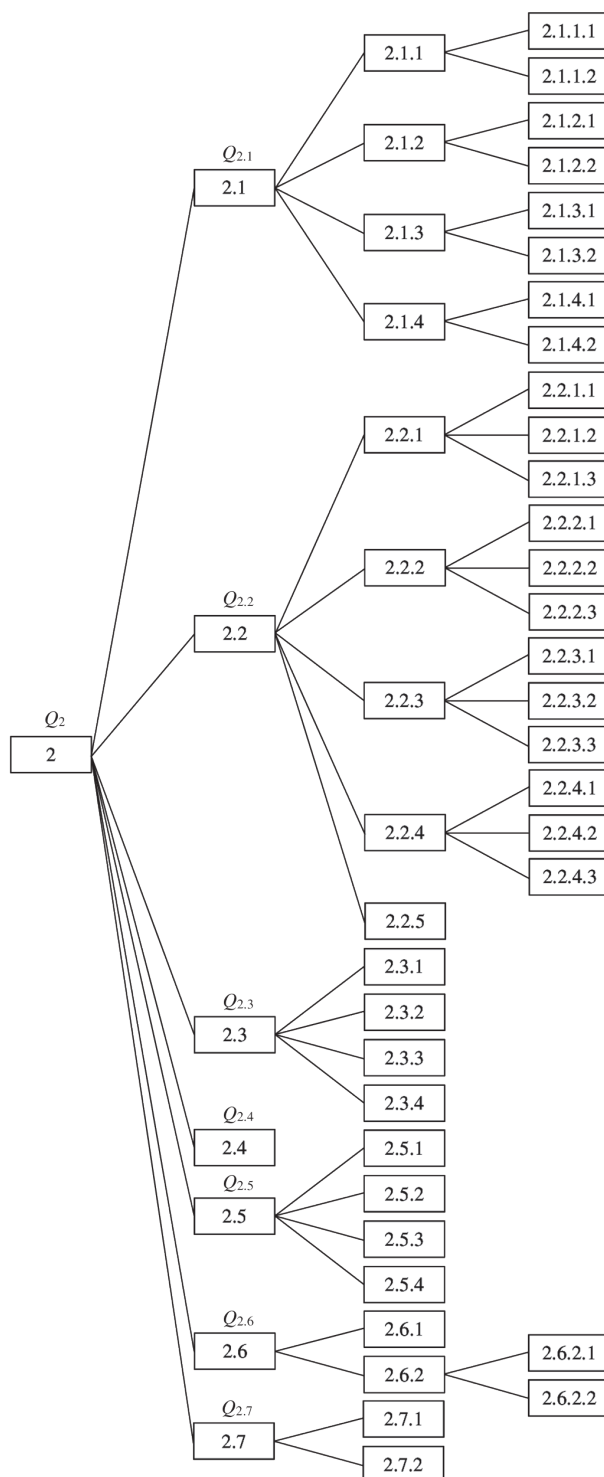


Figure 3. Part of the graph (first, second, third, and fourth levels) shows criteria for evaluating the methodological activity of academics

Source: developed by the authors

For the group of sub-criteria 2.3, the values of $P_{2.3.i}$ correspond to the number of sets of tasks prepared for student assessment in the current year. The values of $P_{b2.3.i}$

are the maximum number of sets of tasks prepared for student assessment by a teacher (professor, associate professor, or assistant) in the current year.

For the group of sub-criteria 2.4, the value of $P_{2.4}$ corresponds to the number of new forms, methods, and technologies of learning developed and implemented. The value of $P_{b2.4}$ represents the maximum number of such developments per teacher (professor, associate professor, or assistant) in the current year.

For the group of sub-criteria 2.5 the values of $P_{2.5.i}$ correspond to the number of pedagogical and methodological events attended by the teacher, while the values of $P_{b2.5.i}$ represent the maximum number of such events attended by a teacher (professor, associate professor, or assistant) in the current year.

For the group of sub-criteria 2.6, the values of $P_{2.6.i}$ and $P_{2.7.i,k}$ represent the number of open lectures delivered by the teacher in the current year. The values of $P_{b2.6.i}$ and $P_{b2.6.i,k}$

denote the maximum number of open lectures given by a teacher in the current year.

For the group of sub-criteria 2.7, the values of $P_{2.7.i}$ represent the number of reviews of pedagogical and methodological publications conducted by the teacher in the current year. The values of $P_{b2.7.i}$ denote the maximum number of such reviews conducted by a teacher (professor, associate professor, or assistant) in the current year.

The comprehensive index of the effectiveness of scientific activity Q_3 accounts for the evaluation results of the academics based on the criteria presented in Table 3 and is calculated using equation (7):

$$Q_3 = m_3(Q_{3.1} + Q_{3.2} + Q_{3.3} + Q_{3.4} + Q_{3.5} + Q_{3.6} + Q_{3.7} + Q_{3.8}). \quad (7)$$

Table 3. Criteria for evaluating the scientific activity of academics

Graph level 2	Graph level 3	Graph levels 4 and 5
$P_{3.1}$ Scientific publications, patents, and innovative products	$P_{3.1.1}$ Monographs	$P_{3.1.1.1}$ In the national language $P_{3.1.1.2}$ In a foreign language
	$P_{3.1.2}$ Collective scientific works	$P_{3.1.2.1}$ In the national language $P_{3.1.2.2}$ In a foreign language
	$P_{3.1.3}$ Articles published in peer-reviewed scientific journals	$P_{3.1.3.1}$ Articles published in national journals $P_{3.1.3.2}$ Articles published in WoS or Scopus-indexed journals $P_{3.1.3.2.1}$ Quartile Q1 $P_{3.1.3.2.2}$ Quartile Q3 $P_{3.1.3.2.3}$ Quartile Q4 $P_{3.1.3.2.4}$ Quartile Q5
	$P_{3.1.4}$ National and/or international conference materials	$P_{3.1.3.3}$ Articles published in other journals $P_{3.1.4.1}$ Not indexed by WoS or Scopus $P_{3.1.4.2}$ Indexed by WoS or Scopus
	$P_{3.1.5}$ Conference report abstracts	$P_{3.1.5.1}$ National conference $P_{3.1.5.2}$ International conference
	$P_{3.1.6}$ Patents and certificates of copyright registration	$P_{3.1.6.1}$ Patent for invention $P_{3.1.6.1.1}$ National patent $P_{3.1.6.1.2}$ International patent $P_{3.1.6.2}$ Utility model patent $P_{3.1.6.3}$ Industrial design certificate $P_{3.1.6.4}$ Copyright registration
	$P_{3.1.7}$ Registration of new types of equipment, technologies, plant varieties, materials, etc.	
	$P_{3.2.1}$ Supervising awarded scientific work of students	$P_{3.2.1.1}$ Scientific work awarded at the national level $P_{3.2.1.2}$ Scientific work awarded at the international level
	$P_{3.2.2}$ Promoting science among students (scientific and cognitive activities)	
	$P_{3.2.3}$ Articles in peer-reviewed scientific journals co-authored with students	$P_{3.2.3.1}$ Articles published in national journals $P_{3.2.3.2}$ Articles published in WoS or Scopus-indexed journals $P_{3.2.3.3}$ Articles published in other journals
	$P_{3.2.4}$ National and/or international conference materials co-authored with students	$P_{3.2.4.1}$ Not indexed by WoS or Scopus $P_{3.2.4.2}$ Indexed by WoS or Scopus
	$P_{3.2.5}$ Conference report abstracts co-authored with students	$P_{3.2.5.1}$ National conference $P_{3.2.5.2}$ International conference
$P_{3.2}$ Scientific work with students and its results		

Table 3. Continued

Graph level 2	Graph level 3	Graph levels 4 and 5
$P_{3.2}$ Scientific work with students and its results	$P_{3.2.6}$ Patents and certificates of copyright registration co-authored with students	$P_{3.2.6.1}$ Patent for invention
		$P_{3.1.6.1.1}$ National patent
		$P_{3.1.6.1.2}$ International patent
		$P_{3.2.6.2}$ Utility model patent
		$P_{3.2.6.3}$ Industrial design certificate
$P_{3.3}$ Successful defence of theses (dissertations) supervised by the teacher	$P_{3.2.7}$ Registration of new types of equipment, technologies, plant varieties, materials, etc. co-authored with a student	$P_{3.2.6.4}$ Copyright registration
$P_{3.4}$ h-index of the teacher in databases	$P_{3.3.1}$ PhD	
$P_{3.5}$ Successful defence of theses (dissertations) by the teacher	$P_{3.3.2}$ Doctor of Science	
$P_{3.6}$ Participation in specialised scientific councils and reviewing process	$P_{3.6.1}$ Participation in specialised academic councils	$P_{3.6.1.1}$ Head of the specialised academic council
		$P_{3.6.1.2}$ Member of the specialised academic council
		$P_{3.6.1.3}$ Official opponent
		$P_{3.6.1.4}$ Reviewer
		$P_{3.6.2.1}$ Monograph
	$P_{3.6.2}$ Participation in reviewing processes	$P_{3.6.2.2}$ Articles
		$P_{3.6.2.2.1}$ Articles published in national journals
		$P_{3.6.2.2.2}$ Articles published in WoS or Scopus-indexed journals
		$P_{3.6.2.3}$ Scientific projects, works, etc.
$P_{3.7}$ Participation in scientific projects, research works, grants, programmes, internships, etc.	$P_{3.7.1}$ Head of scientific projects, research works, grants, programmes, etc.	$P_{3.7.1.1}$ International level
		$P_{3.7.1.2}$ National level
		$P_{3.7.1.3}$ Regional level
		$P_{3.7.1.4}$ University level
		$P_{3.7.2.1}$ International level
	$P_{3.7.2}$ Participant in scientific projects, research works, grants, programmes, etc.	$P_{3.7.2.2}$ National level
		$P_{3.7.2.3}$ Regional level
		$P_{3.7.2.4}$ University level
		$P_{3.8.1.1}$ National journal
		$P_{3.8.1.2}$ Journal indexed by WoS or Scopus
$P_{3.8}$ Serving on editorial boards of scientific journals	$P_{3.8.1}$ Editor-in-chief of peer-reviewed scientific journal	$P_{3.8.2.1}$ National journal
		$P_{3.8.2.2}$ Journal indexed by WoS or Scopus
		$P_{3.8.3.1}$ National journal
		$P_{3.8.3.2}$ Journal indexed by WoS or Scopus
$P_{3.8}$ Serving on editorial boards of scientific journals	$P_{3.8.2}$ Deputy chief editor or secretary of a peer-reviewed scientific journal	
$P_{3.8}$ Serving on editorial boards of scientific journals	$P_{3.8.3}$ Member of the editorial board of peer-reviewed scientific journals	

Source: developed by the authors

For all groups of sub-criteria for evaluating the scientific activity of academics (Fig. 4), the indices $Q_{3,i}$ are calculated using equations (1) and (2), which consider the connection between the sub-criteria.

For the groups of sub-criteria of criterion 3, the values of $P_{3,i}$, $P_{3,i,k}$, $P_{3,i,k,j}$ and $P_{3,i,k,j,m}$ are equal to the number of achievements by the academic (the number of monographs, articles, theses, patents, etc.; the number

of peer reviews, dissertation defences; or the number of specialised academic councils, scientific projects, and programmes, or editorial boards of scientific journals in which the academic participates) in the current year. Meanwhile, the values of $P_{b3,i}$, $P_{b3,i,k}$, $P_{b3,i,k,j}$ and $P_{b3,i,k,j,m}$ represent the maximum number of such achievements by an academic (professor, associate professor, assistant) in the current year. For the group of sub-criteria 3.4, the values

of $P_{3.4,k}$ are equal to the h-index of the academic in the Web of Science (WoS) or Scopus databases, and the values of $P_{63.4,k}$ are equal to the maximum h-index of a teacher (professor, associate professor, or assistant) at the university during the current year. The comprehensive index of the effectiveness of organisational activity Q_4 considers

the evaluation results of the academics based on the criteria presented in Table 4 and is calculated using equation (8):

$$Q_4 = m_4(Q_{4.1} + Q_{4.2} + Q_{4.3} + Q_{4.4} + Q_{4.5} + Q_{4.6} + Q_{4.7} + Q_{4.8} + Q_{4.9}). \quad (8)$$

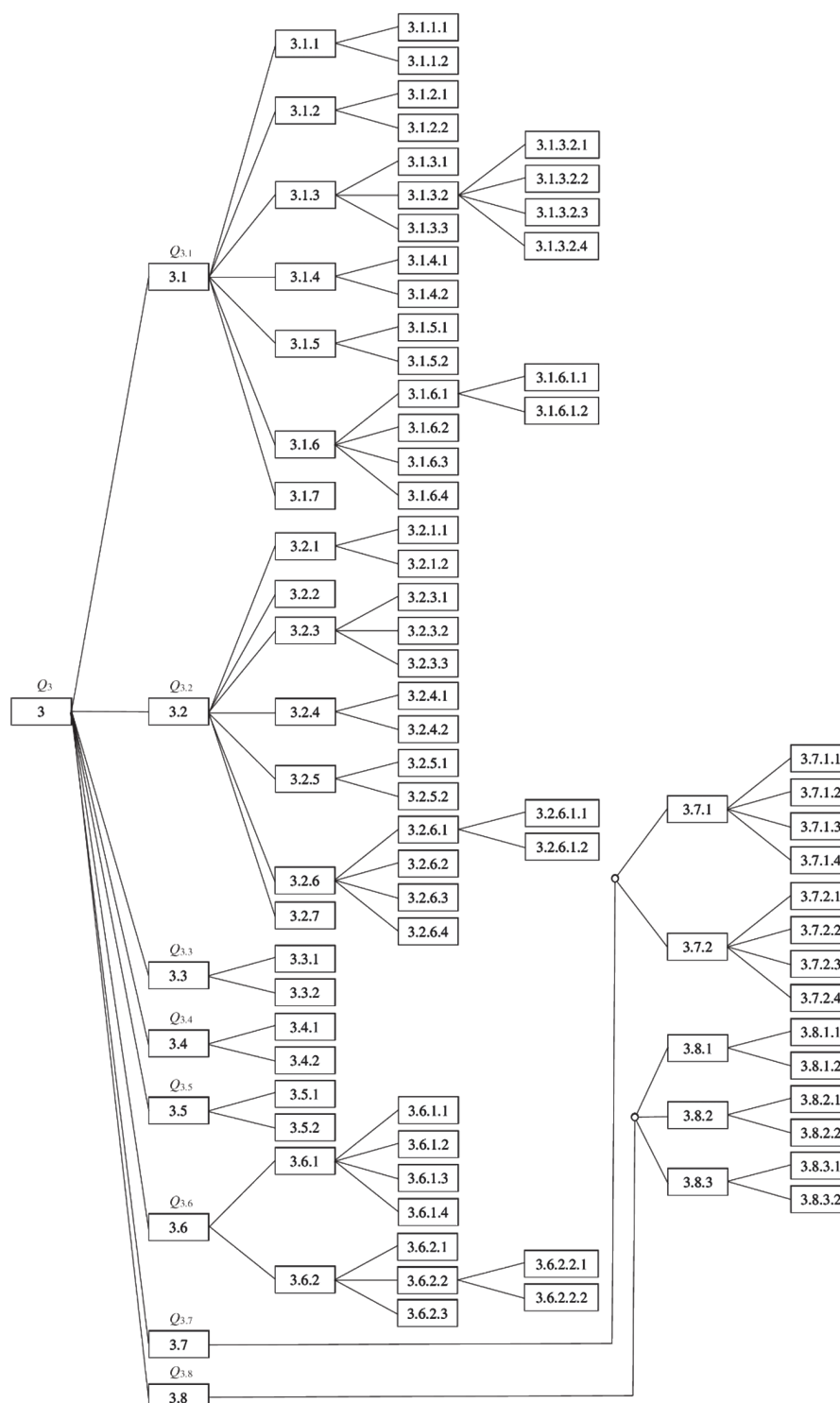


Figure 4. Part of the graph (first, second, third, fourth, and fifth levels) shows criteria for evaluating the scientific activity of academics

Source: developed by the authors

Table 4. Analysis of the results of respondents' psychological well-being by clusters (scales) before and after the experiment

Graph level 2	Graph level 3	Graph level 4
$P_{4.1}$ Organising scientific events (serving on organising committees for conferences, scientific seminars, etc.)	$P_{4.1.1}$ International level	
	$P_{4.1.2}$ National level	
	$P_{4.1.3}$ Regional level	
	$P_{4.1.4}$ University level	
$P_{4.2}$ Organising artistic and/or sporting events.	$P_{4.2.1}$ International level	
	$P_{4.2.2}$ National level	
	$P_{4.2.3}$ Regional level	
	$P_{4.2.4}$ University level	
$P_{4.3}$ Organising educational excursions, inviting lecturers and specialists in the field to teach		
$P_{4.4}$ Career orientation activities, coverage of university activities	$P_{4.4.1}$ University event participation	
	$P_{4.4.2}$ Participating in TV or radio shows	
	$P_{4.4.3}$ Print media publications	
	$P_{4.4.4}$ Social networking content creation	
$P_{4.5}$ Organisation of students' scientific work	$P_{4.5.1}$ Organisation and supervision of the student research group	
	$P_{4.5.2}$ Organisation of scientific competitions or olympiads	$P_{4.5.2.1}$ International level
		$P_{4.5.2.2}$ National level
		$P_{4.5.2.3}$ Regional level
		$P_{4.5.2.4}$ University level
	$P_{4.5.3}$ Organisation of scientific conferences	$P_{4.5.3.1}$ International level
		$P_{4.5.3.2}$ National level
		$P_{4.5.3.3}$ Regional level
		$P_{4.5.3.4}$ University level
$P_{4.6}$ Performance of duties as the academic group curator		
$P_{4.7}$ Performance of departmental duties (deputy head of department, departmental secretary, responsible for methodological or scientific work, etc.)		
$P_{4.8}$ Performance of roles in councils, commissions, or groups (scientific, technical, methodological, expert, etc.)	$P_{4.8.1}$ International level	
	$P_{4.8.2}$ National level	
	$P_{4.8.3}$ Regional level	
	$P_{4.8.4}$ University level	
$P_{4.9}$ Roles related to educational programme support	$P_{4.9.1}$ Guarantor	
	$P_{4.9.2}$ Support group member	

Source: developed by the authors

For all groups of sub-criteria for evaluating the organisational activity of academics (Fig. 5), the indices $Q_{4.i}$ are calculated using equations (1) and (2), which account for the connection between the subcriteria.

For the groups of sub-criteria 4.1-4.5 the values of $P_{4.i}$, $P_{4.i.k}$, and $P_{4.i.k.j}$ are equal to the number of events in which the teacher participated or organised in the current year, while the values of $P_{b4.i}$, $P_{b4.i.k}$, and $P_{b4.i.k.j}$ are equal to the maximum number of events in which a teacher (professor, associate professor, assistant) participated or organised in the current year. For the groups of

sub-criteria 4.6-4.9 the values of $P_{4.i}$ and $P_{4.i.k}$ are equal to the number of tasks assigned to a teacher in the current year, while the values of $P_{b3.4.k}$ are equal to the maximum number of tasks assigned to a teacher in the current year. Using the calculated value of the comprehensive index of the effectiveness of academics' activity Q , the university, faculty (institute), and department ratings are formed for each category of academic staff (professor, associate professor, assistant). The level of academics' performance is also determined for each academic according to the scale presented in Table 5.

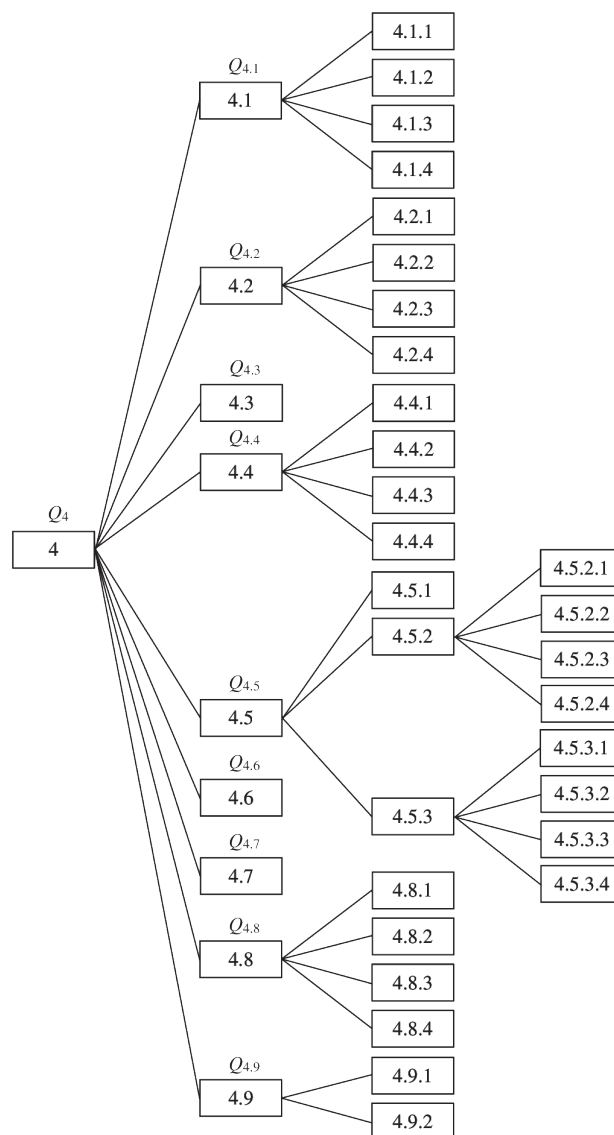


Figure 5. Part of the graph (first, second, third, and fourth levels) shows criteria for evaluating the organisational activity of academics

Source: developed by the authors

Table 5. Academic staff rating scale by comprehensive index Q

Level designation	Academic staff performance level	Comprehensive index Q
A	Very high	0.90-1.00
B	High	0.80-0.89
C	Sufficient	0.70-0.79
D	Medium	0.60-0.69
E	Low	< 0.59

Source: developed by the authors

According to the Law of Ukraine No. 1556-VII (2014), the rating of academics must be publicly available on the official website of the university. Moreover, it is advisable to form separate ratings for professors, associate professors, and assistants. Additionally, it is

appropriate to form university, faculty (institute), and department ratings of academics, taking into account their positions. It is recommended to place the results of the evaluation of the effectiveness of academics' activities in the portfolios of academics on the university

website (an example of a portfolio is shown in Fig. 6). The portfolio can contain information about the comprehensive index Q and its components Q_1 , Q_2 , Q_3 , and Q_4 for the last five years, as well as the performance level and position of the academic in the university, faculty (institute), and department ratings. The higher the value

of the comprehensive index Q , the higher the position of the academic in the rating. Evaluation makes it possible to monitor the effectiveness of academics' pedagogical, methodological, scientific, and organisational activity, and to compare the teacher's results with the results of other academics in similar positions.

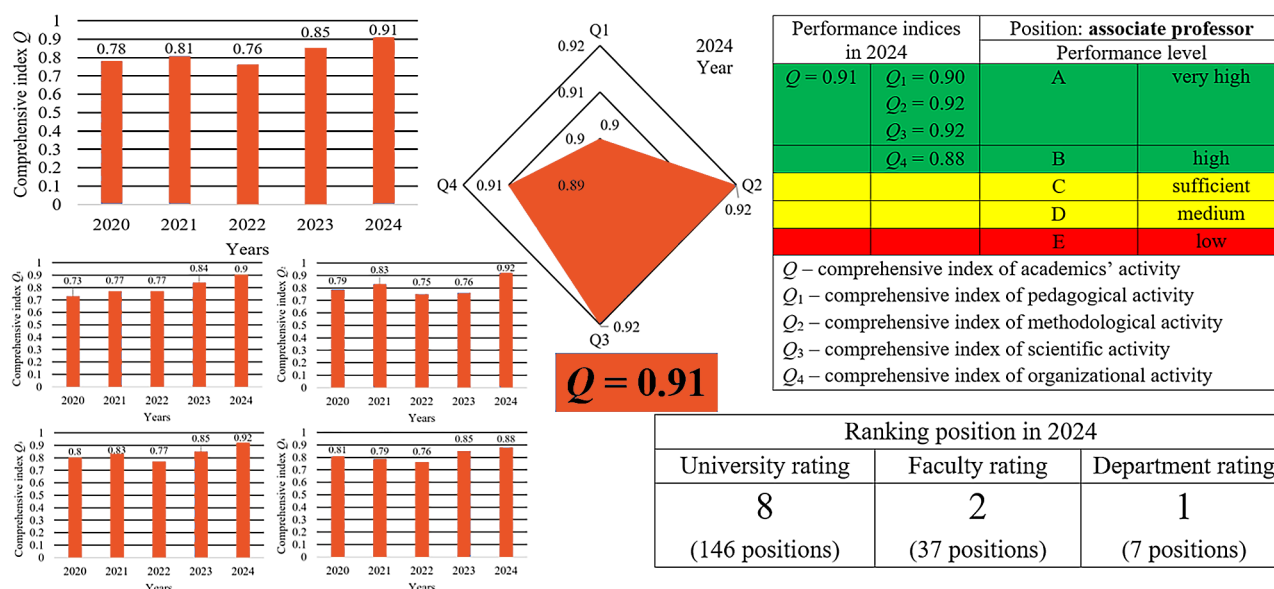


Figure 6. Academic portfolio

Source: developed by the authors

A similar system for evaluating the performance of academics can be applied at the national level. In this case, it would be necessary to take the performance results of the academic staff across all universities in the country as the basic indices. The proposed system of comprehensive evaluation of academic staff activity includes a set of criteria by which academics are evaluated in most universities across Ukraine. In particular, the system includes the criteria defined by N. Morze & O. Buinytska (2017): results of student evaluations of teaching activities; the number of scientific publications in national and international journals indexed by WoS or Scopus; participation in conferences, seminars, etc.; receipt of individual grants; defence of dissertations; preparation of students for participation in olympiads and scientific competitions; creation of training courses; preparation of regulatory filings; and participation in internship programmes. The system also takes into account indices of educational work, as proposed by V. Andrushchenko *et al.* (2017). O. Yaroshenko (2021) notes that depending on the development strategy of the university, its mission, and tasks, it may be possible to award additional points for priority types of activities or for special personal achievements that significantly affect the university's image.

M. Riaz (2000) and S. Young *et al.* (2009) identified the most common criteria used by universities to evaluate the performance of academics based on student feedback, among which are criteria included in the proposed comprehensive evaluation system. These criteria include

preparation for classes, clarity of explanations, encouraging classroom activity, treating students' questions and suggestions with respect, usefulness of recommended supplemental materials, information about the course programme, and information about the criteria, terms, and forms of evaluation of learning outcomes. N. Kornell & H. Hausman (2016) point out that the results of student evaluations of teachers are important because they affect teachers' career progression, salary levels, and tenure.

According to the recommendations of M. Shah & C. Sid Nair (2012), it is advisable to evaluate the performance of teachers using student feedback at the end of each academic period (semester). S. Deng & X. Que (2018) argue that university administration can use the results of students' evaluations of teachers' performance to understand the general level of teaching, which, in turn, can help to propose effective measures for the management of the educational process. The question of how competent students are to evaluate the quality of teaching and course content remains controversial. M. Husain & S. Khan (2016) believe that students are not competent enough to evaluate a course holistically (e.g., its purpose, content, methods, and assessment criteria) but can provide feedback on the quality of classes or teaching. S. Young *et al.* (2009) found that student gender and teacher gender play an important role in how students evaluate teachers. Specifically, students rated teachers' pedagogical skills and course content higher for teachers of one gender than for the other. However, no

gender bias was found when students rated teachers' personal characteristics. Additionally, students who attend classes regularly tend to rate the course more highly.

According to S. Yu (2016), an important element of the academics' evaluation system is the consideration of the results of student learning, in particular, students' grades upon completing the course. In the proposed system, sub-criterion 1.3 reflects the results of student learning. For the objective assessment of academic staff, it is important to determine the weighting coefficients of the criteria. The most important criteria for achieving the strategic goal of the university and increasing its ranking should have higher values of weighting coefficients. T.-V. Duong *et al.* (2015) justified the weighting coefficients of groups of criteria through which students evaluate teachers: course content – 0.18; teaching method – 0.17; availability of teaching and methodological materials – 0.13; teacher's responsibility – 0.19; teacher's behaviour – 0.28. As noted by S. Moroz *et al.* (2017), the selection of the values of the weighting coefficients falls under the authority of the university administration.

In the proposed evaluation system, students evaluate the performance of teachers on a five-point scale. M. Aslam (2013) also suggested using a five-point Likert response scale for the quantitative assessment of teachers, where: 1 – strongly disagree, 2 – disagree, 3 – undecided, 4 – agree, and 5 – strongly agree. Y. Yan *et al.* (2010) suggest using another five-level scale for the evaluation of teachers' activities: "excellent", "good", "medium", "general", and "unqualified". Instead, P. Apodaca & H. Grad (2005) recommend using a seven-point scale: 1 – totally disagree; 2 – fairly strongly disagree; 3 – disagree; 4 – neither agree nor disagree; 5 – agree; 6 – fairly strongly agree; 7 – totally agree.

H. Gallagher (2004) recommends that at the end of each evaluation cycle, those responsible for its implementation meet with academic staff to discuss the results. This approach facilitates the identification of shortcomings in the evaluation system, enables the gathering of recommendations from academic staff, and provides opportunities to suggest ways to improve teacher effectiveness. O. Smagina *et al.* (2018) recommend the use of automated systems for the evaluation of academic staff. It should be noted that the proposed comprehensive evaluation system supports this functionality. I. Gryshchenko (2017) believes that the evaluation of academic staff can help determine and compare quantitative and qualitative indices of their professional activity, as well as create motivational mechanisms to improve these indices. Moreover, the position in the ranking significantly contributes to the formation of the teacher's image. According to I. Syngaivska (2015), it is necessary to remember that to succeed in the profession, personal responsibility, motivation for professional success, job satisfaction, and favourable conditions for self-development are also important.

The proposed comprehensive evaluation system is based on the best practices of academic staff evaluation implemented in universities across different countries. The

system enables the evaluation of academics' achievements in pedagogical, methodological, scientific, and organisational work. The evaluation system is flexible, as it is possible to adapt the evaluation criteria depending on the field in which the academics work (art, technology, economy, etc.). Based on the evaluation results, the university administration will have the ability to motivate academic staff and make personnel decisions in an objective and transparent manner.

CONCLUSIONS

The proposed system for evaluating the activities of academic staff takes into account the results of pedagogical, methodological, scientific, and organisational activities based on the defined criteria for the current year. All activity results are compared with the highest achievements of academic staff within the university while considering the position of the academics. Based on the results of the academic performance evaluation, it is proposed to compile ratings for academics at the university, faculty (institute), and department levels and to determine their performance level on a scale of A (very high), B (high), C (sufficient), D (medium), and E (low).

The implementation of such a system can help identify the "weak" and "strong" aspects of the academic staff's activities and contribute to the creation of a competitive environment within the academic staff of the university. This approach will also motivate academics to improve their performance. The evaluation system will enable the university administration to create mechanisms for improving the effectiveness of various areas of academics' activities, aligned with the university's development strategy. Furthermore, it will allow for the transparent recognition of the best academics for their achievements in the current year using objective and clear criteria. It should be noted that the list of criteria for the evaluation of academics' activities is not exhaustive and can be adjusted depending on the areas in which academics are engaged. Therefore, the proposed system is flexible.

It is important to publish the results of academics' evaluations on university websites, particularly through the creation of academic portfolios. This measure will enhance academics' confidence in the evaluation process and the fairness of recognising achievements based on results. A similar evaluation system could be implemented at the national level, allowing for the evaluation of all academics using uniform criteria and enabling the creation of a national ranking of academics. Such a ranking would support an objective assessment of universities' activities and potential. Future research should focus on substantiating the procedures for implementing a comprehensive system for the evaluation and motivation of academic staff in universities.

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CONFLICT OF INTEREST

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Система комплексного оцінювання діяльності науково-педагогічних працівників

Анотація. Університети щорічно проводять оцінювання діяльності науково-педагогічних працівників для їх заохочення за високі досягнення та розроблення програм підвищення їхньої професійної кваліфікації. Переважно, оцінювання діяльності науково-педагогічних працівників проходить за результатами наукової роботи, однак важливо урахувати й інші напрями їхньої діяльності. Тому, метою дослідження було розробити систему комплексного оцінювання науково-педагогічних працівників, яка б ураховувала результати їхньої навчальної, методичної, наукової та організаційної роботи. Для вивчення нормативних документів, які визначають систему оцінювання науково-педагогічних працівників в університетах, використано метод аналізу. Для моделювання структури зв'язків між критеріями розробленої системи оцінювання науково-педагогічних працівників використано графи. Запропонована система оцінювання передбачає визначення показників результативності роботи викладачів як за окремими видами діяльності, так і комплексно. Відповідно до системи, усі результати діяльності науково-педагогічних працівників порівнюють з найкращими показниками, досягнутими в університеті або на загальнодержавному рівні у поточному році. Результати обчислення комплексного показника ефективності роботи кожного науково-педагогічного працівника дозволяють сформувати університетський, факультетський та кафедральний рейтинги науково-педагогічних працівників, а також визначити рівень досягнень викладачів за запропонованою шкалою. Результати оцінювання доцільно висвітлювати у портфоліо викладачів на сайті університету, що забезпечить прозорість оцінювання. Це також дозволить простежити динаміку зміни рівня ефективності роботи науково-педагогічних працівників упродовж певного періоду. Система оцінювання дозволить зробити більш ефективним менеджмент персоналу в університетах, що сприятиме досягненню стратегічних цілей розвитку університету. Запропонована система оцінювання діяльності науково-педагогічних працівників може бути впроваджена в університетах та на загальнодержавному рівні, що сприятиме створенню конкурентного середовища між науково-педагогічними працівниками на загальнодержавному, університетському, факультетському та кафедральному рівнях

Ключові слова: оцінювання викладачів і наукових співробітників; критерії оцінювання; академічна ефективність; рейтинг викладачів; академічне портфоліо

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Abstract. The maritime industry contributes to pollution, including oil spills, air emissions (such as sulphur oxides and nitrogen oxides), and ballast water discharge, negatively impacting marine ecosystems. As the global maritime industry continues to move towards stricter environmental regulations, endorsed by the International Maritime Organisation's (IMO) MARPOL Convention (which mandates the reduction of pollution from ships), and more sustainable practices, future ship engineers with environmental competence are crucially needed to meet the demands of the evolving industry. This study explored the use of e-learning facilitated by the LMS Moodle platform for future specialists in ship technical systems and complex operations, particularly in developing environmental professional competence during the Maritime English course. To achieve the research objective, a survey method was employed to collect and analyse information on the development of environmental professional competence among students during discussions in English for Specific Purposes (ESP) classes. The findings indicated that the use of e-courses on the LMS Moodle platform and e-learning through Zoom video conferences significantly contributes to the formation of professional competence among future seafarers. The combination of these technologies provided an interactive approach to learning, allowing students to access educational materials at a time convenient for them and actively participate in distance learning. This method fostered the development of independent work skills, critical thinking, and enhances understanding of specialised topics through interactive discussions and real-time exchange of ideas. The practical value of this research lies in its potential application by teachers when preparing lessons for English for Specific Purposes (ESP), literature, history, and other subjects

Keywords: maritime institutions; marine environment; digitalisation; LMS Moodle; Maritime English; e-learning

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INTRODUCTION

Ecology plays a crucial role in the life of every individual, and its significance has only increased in modern times, given the alarming state of the world's oceans and the catastrophic damage caused by harmful emissions from industrial production, oil rigs, and military aggression. The depletion of natural resources, oil spills, and chemical pollutants have resulted in the destruction of ecosystems, endangering marine life and contributing to climate change. The marine industry is deeply intertwined with these environmental issues, as modern ships, while essential for global trade and transportation, contribute significantly to the problem. Large vessels release harmful gases, such as sulphur oxides and nitrogen oxides, which pollute the atmosphere, and their operations often involve discharging ballast water and fuel residues that harm marine species and delicate ecosystems. Furthermore, ship-based accidents, oil spills, and the improper disposal of waste materials have devastating effects on marine biodiversity. As the shipping industry continues to grow and adapt to meet global demand, it faces the challenge of reducing its environmental footprint. Modern ships, particularly those involved in the transportation of goods and resources, must comply with stricter international environmental regulations, such as those set by the International Maritime Organisation (IMO). This compliance necessitates implementing greener technologies, such as cleaner fuels, energy-efficient designs, and more sustainable waste management practices, to minimise the environmental damage caused by the industry.

The role of marine specialists familiar with modern environmental challenges is vital in addressing these issues and preventing negative consequences. Third-year cadets of the ship engineering department study the main components of environmental protection, including the prevention of sea pollution by ship waste and methods for addressing oil spills in the sea. They also identify the causes and consequences of marine pollution, as well as actions for preventing and mitigating marine pollution from ships (Tsimplis, 2020).

Scientists emphasise the importance of seafarer training, focusing on energy-efficient ship operations through the integration of digital tools, addressing knowledge gaps, and enhancing environmental awareness to mitigate climate change (Dewan & Godina, 2024). O. Olorunjobi *et al.* (2023) explore the growing challenges and expectations in the maritime industry driven by technological advancements, analysing the causes and consequences of this revolution with projections beyond 2030. Key findings highlight the development of smart devices, unmanned vessels, and digital transformation in ports, which enhance operational flexibility, energy efficiency, and support the industry's transition towards low-emission systems.

In-water hull cleaning can help reduce fuel consumption and prevent the spread of non-native species by removing foulants from ship hulls, but it also risks releasing toxic antifouling paint residues into the environment. Analysis of cleaning effluents revealed significant levels of suspended solids and metals like copper and zinc, highlighting the

need for recovery or treatment to mitigate environmental risks in ports (Soon *et al.*, 2021). A. Loh *et al.* (2020) found that suspended particulate matter (SPM) enhances the dispersion and stability of both mechanically and chemically dispersed oil, preventing recoalescence and improving long-term stability, particularly when smaller particles are present. Oil spill dispersant (OSD) is commonly used to manage marine oil spills by breaking oil into smaller droplets, aiding biodegradation.

This study aimed to describe the e-learning of future specialists in ship technical systems and complex operations on the LMS Moodle platform, specifically to develop environmental professional competence in the Maritime English course.

MATERIALS AND METHODS

The research presents a case study of the Maritime Applied College at Kherson State Maritime Academy. The Maritime English educational programme for future specialists in ship technical systems and complex operation e-learning includes a module devoted to the marine environment. This module covers various topics, such as MARPOL Annexes, SOPEP equipment, prevention of oil spills on deck or in the engine room, and the application and operation of ship-board machines (incinerators, compactors, comminutors).

The experiment was conducted over one academic year – from September to May – and included several key stages: preparatory, ascertaining, formative, and control. Each stage involved the application of various research methods and tools to collect, analyse, and interpret the results. At the preparatory stage (1-2 months), the purpose, tasks, and hypotheses of the research were formulated, and educational and methodological materials were developed for the integration of ecological components into the educational process. Educational groups participating in the experiment were determined, and tools were created for the initial diagnosis of the level of environmental competence, including questionnaires, tests, and control tasks. At the ascertaining stage (3-4 months), an initial diagnosis of the level of environmental knowledge and competencies of students was carried out. The survey and testing enabled the identification of the initial level of environmental awareness, attitudes towards environmental problems, and the ability to apply environmental knowledge in the context of ship technical systems management.

The formative stage (6-8 months) involved the implementation of various teaching methods, particularly electronic courses on the LMS Moodle platform and interactive video conferences on Zoom. Particular attention was paid to the use of group discussions, case methods, and project activities, with an emphasis on the environmental aspects of shipping. During this phase, students engaged in interdisciplinary lectures, analysed real-world situations, and developed environmental strategies for ship operations. At the control stage (1-2 months), a final diagnosis was carried out to assess the effectiveness of the implemented methods.

The collected data facilitated comparisons between the experimental and control groups and helped identify changes in the level of environmental professional competence of future ship specialists.

The experiment involved 120 cadets specialising in maritime disciplines, enrolled in the “Management of Ship Technical Systems and Complexes” programme. Participants were divided into two groups: control (60 students) and experimental (60 students). The selection of groups was based on the principle of random sampling, which ensured the reliability of the results and minimised the possibility of systematic errors in the study. Various research methods were used to achieve the study’s objectives. Questionnaires and surveys (conducted via a Google Form, where students answered anonymously) enabled the collection of data on the initial level of environmental awareness, knowledge, and attitudes of students towards ecological problems. Testing was employed to evaluate theoretical knowledge of ecology at various stages of the experiment, allowing an objective assessment of the dynamics of changes. The case method was utilised during practical sessions, where students analysed real-world situations related to

environmental challenges in shipping, enhancing their critical thinking and ability to make informed decisions. Observation of the educational process provided insight into the behaviour of students during discussions and active interactions in classes. Zoom video conferences contributed to the development of communication skills in the format of interactive learning.

All procedures performed during the research complied with ethical norms, respecting the honour and dignity of the respondents. Age characteristics were also taken into account. During the pedagogical experiment, no individual’s rights were violated, anonymity was maintained, and the research adhered to the developed recommendations regarding the ethical conduct of pedagogical studies provided by authoritative organisations (Declaration of Helsinki, 2013). The main source of materials was drawn from the LMS Moodle platform of Kherson State Maritime Academy, Ukraine (the online course “Maritime English” developed for future specialists in ship technical systems and complex operations). Figure 1 presents the name of the module, along with the corresponding topic, objectives, essential competencies, and the first task.

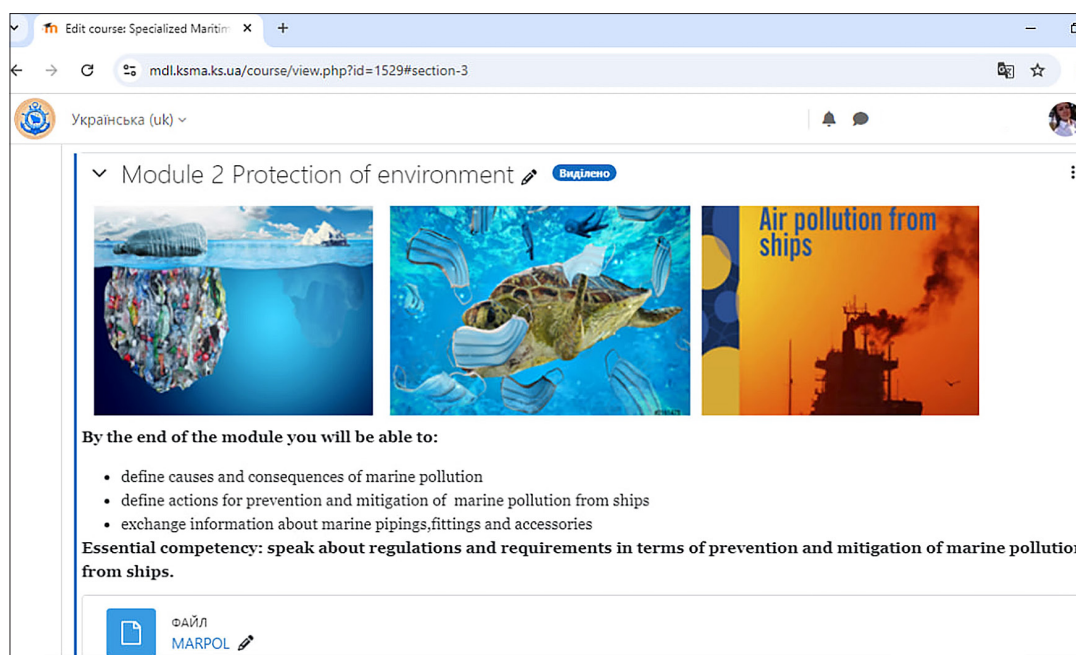


Figure 1. “Protection of Environment” module on LMS Moodle

Source: Maritime English course on LMS Moodle of Kherson State Maritime Academy

RESULTS AND DISCUSSION

The maritime industry is undergoing significant transformation as it adapts to the growing demand for sustainable practices. Ecological competence, or the ability to understand and apply environmentally responsible behaviours, has become increasingly crucial for professionals within this sector, particularly for specialists in ship technical systems and complex operations. This shift is largely driven by several key factors, including the tightening of environmental regulations and the global emphasis on sustainability

(Kurban, 2018). The international maritime community has seen a surge in environmental regulations aimed at mitigating the industry’s impact on the planet. Organisations such as the IMO have introduced stringent guidelines to address various environmental issues, including pollution, emissions, and waste management (Official website of the International..., n.d.). Notable among these is the MARPOL (Marine Pollution) Convention, which governs the prevention of pollution from ships. MARPOL Annex VI, for example, sets limits on sulphur oxide (SOx) and

nitrogen oxide (NOx) emissions from ship exhausts, pushing the industry towards cleaner fuels and technologies.

Compliance with these regulations is not optional; it is mandatory and enforceable by law. Non-compliance can lead to severe penalties, including fines, detention of vessels, and even criminal charges in some jurisdictions. As a result, specialists in ship technical systems and complex operations must possess a deep understanding of these regulations and the technical expertise to ensure their vessels operate within legal environmental parameters. This need for compliance underscores the importance of ecological competence as a core component of a seafarer's professional skill set. Companies within the maritime sector are now expected to adopt sustainable practices not only as a matter of regulatory compliance but also as part of their corporate social responsibility (CSR). This includes the adoption of cleaner technologies, such as the use of LNG (liquefied natural gas) as a more environmentally friendly fuel alternative, the development of energy-efficient ship designs, and the implementation of comprehensive waste management systems onboard vessels. As key players in the operation and maintenance of maritime vessels, specialists in ship technical systems and complex operations are at the forefront of implementing and managing these ecological practices. Their role extends beyond technical proficiency; they are responsible for ensuring that the ship's systems are not only efficient but also environmentally compliant. This involves understanding the environmental impacts of various shipboard operations, from fuel consumption and emissions to ballast water management and waste disposal.

The development of ecological competence of specialists in ship technical systems and complex operations is therefore critical. It equips them with the knowledge and skills necessary to innovate and adapt to new technologies and practices that minimise environmental harm. Furthermore, as the industry continues to evolve, ecologically competent engineers will be better positioned to contribute

to the design and operation of next-generation vessels that meet the highest environmental standards. Moodle is a popular learning management system (LMS) used to create and deliver online courses during e-learning. It provides a wide range of tools for instructors and students to organise the learning process, share materials, conduct tests, and interact within a learning community (Lytvynova, 2015). In Moodle, one can create a variety of exercises that promote interactive and effective learning. Additionally, Moodle supports exercises with pictures, enabling activities related to graphic materials (Mezentseva, 2020). The main types of exercises that can be created on the Moodle platform include:

“Quizzes”, which include various types of questions: multiple choice (where answers are presented in the form of images), fill-in-the-blank, matching pairs (useful for subjects requiring visual perception), short answer, ordering (students arrange images in the correct order), extended answer, and others. Images, audio, and video can be added to questions (Mohan, 2018). “Polls”, which can also incorporate graphics, enhancing interactivity and engagement. “Assignments”, involve activities where students upload their work as text documents, presentations, videos, images, diagrams, or charts. These submissions can be graded and commented upon (Rasool & Dawod, 2021). The benefits of using drawings in Moodle exercises include improved understanding of material, and helping learners grasp complex concepts more effectively. Interactive graphics make learning more engaging and dynamic (Schaffzin, 2016). In Moodle, the “Glossary” activity serves as a collaborative tool for building a collection of terms and definitions relevant to a particular course or subject. It functions like a dictionary, where each entry can include a term, its corresponding definition, examples, and pictures (Fig. 2). Students can contribute to the glossary, making it a dynamic and evolving resource. Teachers can control whether students can add, edit, or delete entries (Striuk & Semerikov, 2022).

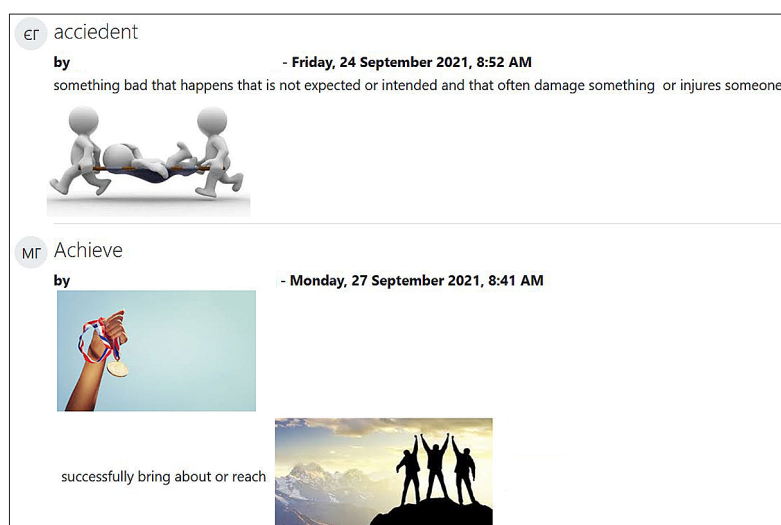


Figure 2. Glossary to the topic “Career Awareness”

Source: Maritime English course on LMS Moodle of KSMA

In Moodle, the “Wiki” activity is a collaborative tool that allows students and teachers to create and edit a collection of interlinked web pages directly within a course (Valko *et al.*, 2021). A Wiki is particularly effective for group projects, where students can work together to develop content, such as a research project, a knowledge base,

or a course manual (Yakhontova, 2003). Each participant can add, modify, or delete content, and the Wiki keeps a history of all changes, allowing users to track revisions and contributions. This activity promotes teamwork, encourages collaborative learning, and provides a dynamic platform for creating shared knowledge within a course (Fig. 3).

Superstructure

Fill in the table with the words and definitions. Add pictures.

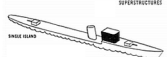
What is superstructure?	Superstructure with living rooms (cabins), galley, mess room, gym, laundry, store room, sickbay, officer's lounge room, chart desk and the navigation bridge is situated on the stern.
To what is superstructure apply to?	Superstructure applies to various kinds of physical structures such as buildings, bridges, or ships having the degree of freedom zero.
What does this word combination consist of?	galley, mess room, gym, laundry, store room, sickbay, officer's lounge room.
What ships have the superstructure? sailboats, fishing boats, passenger ships, and submarines, that project above her main deck. This does not usually include its masts or any armament turrets.	

Figure 3. Students in a group completing the “Wiki” activity

Source: Maritime English course on LMS Moodle of KSMA

The “Interactive Videos” feature (enabled by H5P integration) allows teachers to create and share rich, interactive content directly within their courses. H5P (HTML5 Package) offers a wide range of content types, including quizzes, interactive videos, presentations, games, and simulations. This tool enables instructors to design engaging learning experiences without requiring advanced technical skills (Zaitseva *et al.*, 2022). The integration seamlessly embeds these activities into Moodle, making them accessible across devices. Additionally, students can interact dynamically with content, such as answering questions within videos or participating in interactive timelines. H5P also supports the inclusion of images from the internet, enabling the creation of visually rich and engaging educational materials. Examples include videos embedded with clickable hotspots, quizzes, and informational popups. For instance, a video tutorial on a topic could pause to ask a question, display images related to the content, or include an image with multiple clickable areas that reveal additional information when clicked. This feature is particularly effective for educational diagrams or maps (Zinchenko *et al.*, 2022).

Additionally, teachers can design slide presentations with integrated multimedia, quizzes, and interactive elements. Images from the internet can be incorporated to create visually appealing and educational slides. These activities can be combined to develop complete courses, including diverse tasks aimed at enhancing both theoretical knowledge and practical skills (Yakhontova, 2003). The use of pictures and graphic tasks contributes to more effective learning, the development of visual literacy, and increased student motivation. At the end of the module devoted to the marine environment, students take a test to

demonstrate essential competencies and discuss regulations and requirements related to the prevention and mitigation of marine pollution from ships. Practical lessons and professional training further enhance understanding, particularly through in-depth exploration of environmental aspects specific to maritime work. This includes comprehension of international standards and regulations concerning marine ecology, as well as the organisation of interactions with relevant international organisations and bodies responsible for environmental safety in maritime transport (Liashenko, 2024).

In addition to the methods used (survey, testing, case studies, video conferences, and e-courses on the LMS Moodle platform), several other approaches can further support the development of environmental competence. Engaging students in the creation of practical environmental projects is an especially effective method for enhancing their environmental competence, particularly within the shipping industry (Bekteshi, 2021). This approach enables students to apply theoretical knowledge to real-world scenarios, fostering problem-solving skills through hands-on solutions to current environmental challenges. For instance, one key area for student research is the reduction of emissions from ships. This may involve the development of innovative systems or processes aimed at reducing emissions of harmful substances, such as sulphur oxides (SO_x) and nitrogen oxides (NO_x), which are critical pollutants linked to shipping. Students can also explore the integration of scrubbers or other emission control technologies into ship operations, analysing the cost-effectiveness and efficiency of these solutions. Another promising area for project work (Fig. 4) is the optimisation of energy consumption aboard ships.

Students may analyse energy use patterns in various ship systems, ranging from propulsion to auxiliary machinery, and propose strategies to reduce fuel consumption. This could include investigating energy-efficient designs, hybrid

propulsion systems, or the implementation of waste heat recovery technologies. Projects like these not only improve technical competence but also encourage future specialists to think critically about eco-friendly energy management.

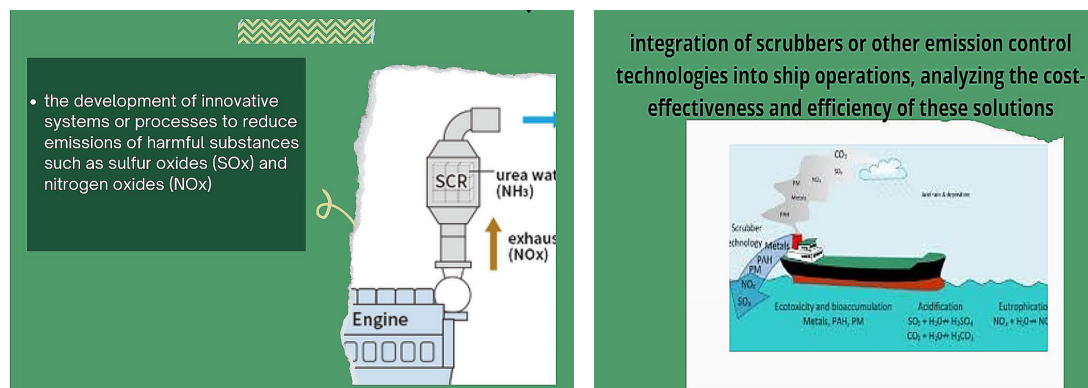


Figure 4. Students' project work

Source: Maritime English course on LMS Moodle of KSMA

In addition, students can work on projects focused on the implementation of alternative energy sources in maritime operations (Semerikov *et al.*, 2020). With the growing importance of sustainability, exploring the use of renewable energy, such as wind, solar, or hydrogen fuel, in shipping provides valuable insights. For example, students might design or evaluate systems for integrating solar panels into ship structures, assess the feasibility of wind-assisted propulsion, or analyse the potential of hydrogen as a clean fuel alternative. These projects encourage innovation and forward-thinking, preparing students to contribute to the decarbonisation of the maritime industry (Sherman *et al.*, 2020). Moreover, project-based training extends beyond technical solutions. Students can be involved in developing environmental policies and frameworks that support sustainable practices within shipping companies or port authorities. They might explore the implementation of green shipping practices or work on establishing guidelines for zero-waste operations aboard vessels. Such activities enable students to understand not only the technical but also the regulatory and managerial aspects of environmental sustainability in shipping.

Project-based learning encourages students to engage in collaborative, interdisciplinary projects (Shintial *et al.*, 2024). For example, they can work alongside professionals from other sectors, such as marine biology, environmental law, or maritime logistics, to create comprehensive solutions to environmental challenges. This approach not only broadens their perspective but also enhances teamwork and communication skills, both of which are essential for future careers in the global maritime industry. Project-based training provides a rich, multifaceted approach to fostering environmental competence. By engaging in real-world projects, students deepen their understanding of sustainability, improve their technical and managerial skills, and contribute to the advancement of greener practices in

the maritime sector. The use of computer simulations and ship simulators with an emphasis on environmental aspects enables students to practise practical skills in virtual conditions. These simulations may include practising emergency responses to situations such as oil spills or managing emissions cleaning systems on ships (Kondratenko *et al.*, 2021).

One of the primary advantages of using simulations is the ability to model emergencies, such as oil spills or chemical leakages, that may occur during ship operations. Through these simulations, students gain hands-on experience in managing complex environmental crises, practising the appropriate protocols for containing spills, minimising environmental damage, and coordinating with environmental response teams. This training not only builds their technical expertise but also fosters a deeper understanding of the ecological consequences of maritime accidents and the importance of swift and effective action. Moreover, simulators offer students the chance to explore the use of alternative propulsion systems, such as hybrid or electric engines, and assess their impact on reducing emissions and fuel consumption. By adjusting different variables, such as engine speed, power output, and fuel type, students can observe how these factors influence the overall environmental footprint of a ship's operations. This hands-on experience helps students grasp the complexities of balancing operational efficiency with environmental sustainability (Tyron *et al.*, 2020).

Ecological masterclasses and workshops are essential components of hands-on learning that provide future maritime specialists with the opportunity to directly apply theoretical knowledge in realworld scenarios. By engaging in practical activities focused on waste management, energy efficiency, and environmental technologies, students develop the skills and insights needed to implement sustainable practices aboard ships and in maritime operations. During various classes, students are taught to handle hazardous

and recyclable materials, reduce waste, and use treatment technologies like incineration and sewage systems in compliance with maritime regulations. Additionally, students explore energy-saving strategies, optimise ship systems, and learn about fuel efficiency and renewable energy sources such as solar and hybrid power. Practical sessions introduce students to technologies like ballast water treatment, exhaust gas cleaning, and advanced hull coatings, providing insight into their environmental benefits and maintenance. Workshops also cover environmental impact assessments and ensure students understand international regulations, such as those from the IMO, with exercises on compliance audits and inspections (Official website of the International..., n.d.).

Involving students in scientific research related to marine transport ecology significantly contributes to the development of their environmental competence. Through participation in various research projects, students engage directly with real-world environmental issues, helping them develop a deeper understanding of the ecological challenges within the maritime industry. For example, students participate in pollution monitoring, where they measure levels of air and water pollutants emitted by ships. Using advanced tools and methodologies, they gather data on harmful substances such as sulphur oxides (SO_x) and nitrogen oxides (NO_x) or track the spread of oil spills (Volkova, 2021). This experience allows them to gain practical skills in environmental monitoring, while also learning how to interpret the data and propose solutions for reducing pollution. Additionally, students conduct research on new environmental standards and analyse their impact on maritime operations (including international conventions like MARPOL). Furthermore, students evaluate the effectiveness of the latest technologies in minimising environmental harm, such as the use of scrubbers, ballast water treatment systems, and alternative fuels. The integration of these methods into the educational process allows for the comprehensive development of environmental competence in future specialists, enhancing their readiness to address modern environmental challenges in the field of shipping.

CONCLUSIONS

In this context, specialists in the operation of ship technical systems and complexes with strong ecological competence are invaluable. They are responsible for implementing

sustainable technologies and practices that not only meet regulatory requirements but also align with the environmental expectations of customers and stakeholders. As such, ecological competence is not just a regulatory necessity but also a competitive advantage in the maritime industry. In summary, the growing importance of ecological competence in the maritime industry arises from a confluence of factors, including tightening environmental regulations, global sustainability goals, and evolving industry expectations. For future specialists in ship technical systems and complex operations, developing this competence is essential, as it enables them to navigate the complexities of modern maritime operations while contributing to the industry's sustainable transformation.

The development of ecological competence enhances the level of ecological knowledge, environmental thinking, environmental awareness, and environmentally safe behaviour among future seafarers. The prospects for further research lie in the analysis of external tools (e.g. VR, AR, AI) to develop the environmental professional competence of future specialists in ship technical systems and complex operations. The results of the pedagogical experiment showed that the integration of environmental components into the educational process had a positive effect on the formation of this competence among future specialists in the management of ship technical systems and complexes. Students participating in the experiment demonstrated a significant improvement in their knowledge of environmental standards and their practical application, particularly in areas such as emissions management, energy conservation, and the minimisation of marine pollution.

Further research could focus on identifying the most effective methods of integrating environmental topics into the training of ship technical systems specialists using technologies such as virtual reality (VR), augmented reality (AR), and artificial intelligence (AI). These innovations have the potential to significantly improve the absorption of environmental knowledge, increase environmental awareness, and promote environmentally responsible behaviour.

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None.

CONFLICT OF INTEREST

None.

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Формування екологічної професійної компетентності майбутніх фахівців управління судновими технічними системами і комплексами

Анотація. Морська галузь є основним джерелом забруднення, включаючи розливи нафти, викиди в повітря (наприклад, оксиди сірки та оксиди азоту) і скидання баластних вод, що впливає на морські екосистеми. Оскільки світова морська галузь продовжує рухатися до більш суворих екологічних норм, схвалених Конвенцією МАРПОЛ Міжнародної морської організації (ІМО), яка зобов'язує зменшувати забруднення з суден) і більш стійких практик, майбутні суднові механіки повинні бути краще підготовлені з екологічної компетентності, щоб відповідати вимогам галузі, що розвивається. Це дослідження було зосереджено на вивченні використання електронного навчання за допомогою платформи LMS MOODLE для майбутніх спеціалістів у галузі суднових технічних систем і складних операцій, зокрема на розвитку екологічної професійної компетентності під час курсу морської англійської мови. Для досягнення поставленої мети було застосовано метод опитування для збору та аналізу інформації про розвиток екологічної професійної компетентності студентів під час бесід на заняттях з дисципліни «Англійська мова за професійним спрямуванням». Зроблено висновок, що використання електронних курсів на платформі LMS MOODLE та електронного навчання за допомогою відеоконференцій Zoom значно сприяє формуванню професійної компетентності майбутніх моряків. Поєднання цих технологій забезпечує інтерактивний підхід до навчання, дозволяючи студентам отримувати доступ до навчальних матеріалів у зручний для них час та брати активну участь у дистанційному навчанні. Це сприяє розвитку навичок самостійної роботи, критичного мислення та поглиблює розуміння спеціалізованих тем через інтерактивні дискусії та обмін ідеями в реальному часі. Практична цінність даного дослідження полягає в можливості його застосування вчителів у підготовці занять з англійської мови за професійним спрямуванням, літератури, історії та інших спеціальних дисциплін

Ключові слова: морські заклади освіти; морське середовище; діджиталізація; LMS MOODLE; морська англійська; електронне навчання

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Formation of the sound-syllabic structure of primary school pupils' speech with intellectual disabilities in Ukrainian language lessons

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Abstract. The purpose of the study was to determine the impact of various methods and techniques on the development of language skills in children with intellectual disabilities. Particular attention was paid to the analysis of innovative approaches, such as mobile applications and interactive teaching methods used to improve oral skills in an inclusive educational environment. The study confirmed the effectiveness of alternative methods and techniques for correcting language deficiencies in students with intellectual disabilities. Children who regularly used interactive tools showed better results in the development of phonemic awareness and the ability to distinguish sounds. Interactive exercises helped alleviate problems with word articulation and syllabic structure development. Studies have shown that children with intellectual disabilities have difficulty perceiving and analysing sounds, and this is due to a lower level of phonemic awareness. The process of forming phonemic awareness is so important in the early stages of speech development that its disruption affects the further acquisition of syllable structure. The article describes approaches to the diagnosis and correction of these disorders, including special exercises for the development of phonemic awareness, articulation exercises and teaching methods for the correction of disorders of the structure of speech sounds and their constituent components. The results can be used to improve educational programmes in specialised schools for children with intellectual disabilities. This contributes not only to the development of language skills, but also to the overall improvement of students' communication skills. The introduction of innovative methods into the educational process provides better results of correctional activities and creates a more favourable environment for children with special needs

Keywords: speech therapy; cognitive development; multimedia; integration of technologies; communication strategies; composite structure; intellectual disabilities

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INTRODUCTION

The formation of a child's speech is one of the most important stages of speech development, especially in primary school. This process is especially important for pupils with intellectual disabilities who find it difficult to acquire basic language skills. Against this background, it is relevant from both theoretical and practical points of view to study the peculiarities of the formation of the constituent structure of language in such pupils. The lack of language skills of

children with intellectual disabilities often hinders their full integration into the educational process and social environment, and solving this problem has become one of the key tasks of modern pedagogy and speech therapy. One of the main problems in working with students with intellectual disabilities is that the phonetic structure of their syllables often does not correspond to age-related norms. This can be manifested by inaccurate reproduction of sounds,



disordered syllable order, slow speech rate or fragmentation. These disorders make it difficult to read, write and learn general conversation.

Researchers V.G. Semenova & V.A. Semenova (2021) consider ways to diagnose and modify the syllabic structure of words in young children with generalised speech development disorder of stage III and find effective ways to overcome difficulties in learning the correct structure of the action. Instead, researchers O. Bielova & S. Konopliash-ta (2023) consider the functional capabilities of oral and articulatory practice of older preschool children with speech disorders, pointing out the importance of sound articulation and word structure that affect language readiness at school.

A. Muqaddas (2021) investigated the impact of language disorders on children's ability to learn foreign languages and found that such disorders affect the development of communication skills and overall academic performance. O.G. Prikhodko *et al.* (2020) highlight the role of digital technologies in addressing the issues of oral speech development of children with hearing loss and emphasise the importance of using technology at all stages of correctional work. E. Matsyuk (2021) focuses on interdisciplinary approaches to remediation and explores the impact of digital technologies on the development of communication skills in students with dysgraphia and dyslexia. K. Strasser *et al.* (2023) evaluate the effectiveness of structured games to improve pre-schoolers' learning outcomes in phonological awareness and mathematical problem-solving. A.A. Siddiqui (2022) describes speech therapy after cleft lip surgery, with a focus on correcting speech errors and developing correct articulation of sounds.

N.Y. Gomzyakova & Y.N. Gomzyakova (2020) analyse the problem of developing second language skills in children with intellectual disabilities and emphasise their importance for full socialisation in modern multicultural societies. This study revealed insufficient theoretical coverage of this topic and different approaches to its solution in practice. The authors reveal a contradiction between the inability of such children to master English as a means of communication and their need to learn English at an accessible level, and that this solves this problem by creating conditions for the development of new psychological and pedagogical approaches. Therefore, the purpose of the authors' study was to develop and implement an effective methodology for the formation of the language structure component in primary school classes of the Ukrainian language for students with intellectual disabilities. This study includes an analysis of existing approaches to teaching these students, identifying their shortcomings and finding new solutions to improve the language skills of students with intellectual disabilities.

The article by M.A. Brazhnik (2023) describes in detail the speech development of this category of learners. The author emphasises that coherent speech plays an important role in the formation of thinking, communication skills, as well as in the regulation of psychological processes. It is the basis for the development of volitional processes and

the emotional sphere. The article by I.M. Matyushchenko & S.I. Gerashchenko (2023) discusses the peculiarities of the consistent language development of children with intellectual disabilities. It is known that speech disorders affect communicative, cognitive and regulatory functions. Due to weak analytical and synthetic activities, children have difficulty learning language, and the correlation between intellectual and linguistic elements remains a complex problem.

The doctoral dissertation of L.O. Feduniva (2024) is devoted to the study of the conditions of teaching dyscalculia correction in primary school students with speech disorders in inclusive classes. The effectiveness of these conditions, in particular psychological and pedagogical support, the formation of mathematical skills, an active approach to learning and interaction with parents, was developed and tested for the first time. In the article by I.D. Shevchenko (2023), the didactic game "Days of the Week in a Circle" is considered as an auxiliary tool for teaching children with intellectual disabilities. The main goal of this game is to teach children to name the days of the week and their order, as well as to consolidate knowledge in memory. This game promotes interaction between students and the teacher, creates a fun atmosphere in the classroom, and evokes positive emotions that help to memorize the material. It will not solve all learning problems, but it will greatly facilitate the process.

In particular, the aim of the study was to test the effectiveness of using alternative technologies to correct language disorders and develop communication skills in primary school children. The objectives of the study include a review of psychological and pedagogical literature on this topic, an analysis of the experience of learning Ukrainian by children with intellectual disabilities, and the relationship between the ability to learn Ukrainian and the need for Ukrainian in educational institutions.

LITERATURE REVIEW

V. Hofmann & C.M. Müller (2021) investigated how social contact affects the development of language skills in students with special needs. They surveyed 1125 students from 16 special needs schools in Switzerland. The results showed that increased social contact improved both verbal and non-verbal skills. However, improved language skills at the beginning of the year will not necessarily lead to increased social contact later in the year. E. Smith *et al.* (2021) studied how the use of smart speakers such as Amazon Alexa & Google Home improves speech intelligibility in adults with intellectual disabilities. The study found that the group using smart speakers significantly improved speech intelligibility compared to the control group. S. Schnepel & P. Aunio (2022) conducted a systematic review of mathematics interventions in primary schools using inclusive education. Their findings suggest that interventions with systematic instruction, feedback, and manipulative techniques are effective in teaching these students. R.S. Dessemontet *et al.* (2021) investigated the impact of audio learning on reading comprehension for students with special educational needs. One study found that students who participated

in a basic programme made significant progress in both verbal and non-verbal reading.

L. Zhuravlova *et al.* (2021) conducted a study of primary school students using speech therapy screening. The study involved 240 students in grades 1-4. The purpose of the study was to test the level of development of language functions important for learning to write and read. It was found that a significant number of pupils have difficulties with the formation of written speech, which requires early detection and correction. This emphasises the importance of using speech therapy screening for comprehensive correction of the language development of primary school children, especially those from "risk groups". M.W. Ok *et al.* (2022) investigated the impact of speech recognition technology on the writing process of students with a high frequency of deviations. Students with spelling difficulties benefited from speech recognition, which made it easier for them to write. However, the effectiveness of the technology depends on the individual needs of the student. Although this study has shown that students perceive the use of computer programmes positively, it is important to incorporate computer programmes into the learning process, taking into account individual differences.

A. Sturrock *et al.* (2022) on children with autism without intellectual disability discuss the subtle language difficulties that affect their socialization and emotional well-being, and the importance of therapeutic support. P.J. Standen *et al.* (2020) investigate a multimodal emotionally aware learning system that improves the emotional state and engagement of students with intellectual disabilities. T.G. Jizzakh (2020) investigated the impact of hearing aids on the language development of children with hearing loss and emphasised the importance of a sound language environment. D.R. Patel *et al.* (2020) point out the importance of a diagnosis based on medical history, intellectual ability and adaptive functioning. More than 75% of people have mild intellectual disability, but the cause is often difficult to determine. Physicians are changing their important role in coordinating care and services. A study conducted by M.A. Khasawneh & M.A. Alkhalal (2020) found that phonological awareness training was effective in improving chronic sound memory in children with learning disabilities in Saudi Arabia. The experimental group significantly outperformed the control group and showed consistent results. In their study, researchers U. Mirecka *et al.* (2018) focused on articulation problems in children with intellectual disabilities and analysed their awareness of the phonemic structure of words. They examined the language of children with mild intellectual disabilities, including children with cerebral palsy and Down syndrome, and found deficits in both quantitative and qualitative word structure. Their research revealed significant reductions, simplifications, and other articulation defects in consonant groups. Meanwhile, S.R. Dessemontet *et al.* (2021) investigated the impact of phonological awareness and knowledge of letter-sound relationships on reading development in children with intellectual disabilities. Their study evaluated the effectiveness

of a sound programme for teaching decoding and spelling to primary school students. Their results showed that reading performance improved significantly in the sound intervention group, highlighting the importance of this approach in teaching children with intellectual disabilities.

L. Chepurna *et al.* (2021) analyse the history of textbooks for special schools, especially for children with intellectual disabilities. Textbooks are seen as important educational tools that support the learning process by integrating content and teaching methods. This study points to a comprehensive analysis of historical experience that is necessary to improve current approaches to the development of historical experience, with a particular focus on textbooks in remedial psychopedagogy with a focus on the mother tongue and reading.

To summarise, in the field of special education, much attention is paid to the development of language, cognitive and social skills of children with special educational needs. Modern research points to the importance of social contact, the use of the latest technologies (smart speakers, speech recognition), phonological awareness, and remedial interventions aimed at improving verbal and non-verbal skills. In addition, physical education and didactic games have a significant impact on the social adaptation and mental development of students with intellectual disabilities. Early interventions, such as speech therapy screening, the use of hearing aids and systematic training, can significantly increase the chances of successful correction and education. The aim of the study was to investigate the effectiveness of using training cards in the formation of the constituent structure of speech in young children with mild mental retardation.

MATERIALS AND METHODS

The study was conducted in a specialised school for children with mental retardation in Kyiv, with pupils in grades 2-4 with mild intellectual disability. The sample consisted of 30 pupils (17 boys and 13 girls) aged 7 to 10 years, with an average age of 8.5 years. Inclusion criteria: confirmed diagnosis of mild mental retardation and basic language skills that allow the student to speak in simple sentences. The exclusion criteria were students with moderate to severe intellectual disabilities, significant language or cognitive impairments, emotional and volitional disorders that could affect their ability to participate in the experiment and to participate in parallel studies. The study consisted of three stages: a diagnostic stage, a modification and development stage, and a final stage. The diagnostic stage involved a preliminary assessment of the student's language development, including his or her ability to reproduce the syllabic structure of words. The modification stage included the development and implementation of special learning cards aimed at improving the formation of the sound-word structure of the language. The final stage includes evaluation of the effectiveness of the implemented methods.

Training cards were developed and used to promote the development of the syllabic structure of language.

The cards contained visual cues in the form of images of objects, which helped students make connections between images and sounds. The tasks on the cards involve forming words from the proposed syllables, practising correcting mistakes in words, and reproducing the

correct sound composition. Using the pronunciation practice cards, the children were able to practice pronouncing the sounds they struggled with. Table 1 provides a detailed description of the materials and methods used in the study.

Table 1. Materials and methods used in the study

Type of material/method	Description	Purpose
Didactic cards	Cards with images of objects and their characteristics	For the development of descriptive speech
Sets of game objects	Various items to classify by characteristics	For game exercises and classification tasks
Audio and video materials	Entries containing examples of adjectives	For visualization of speech structures
Handout cards	Cards with writing tasks	To practice writing
Computers and projectors	Equipment for reproducing educational materials	For interactive learning
Tests for assessing language skills	Specialised techniques for assessing the sound-syllable structure of speech	To diagnose the initial level of speech
Playful exercises	Tasks that involve active participation of children in the learning process	To engage children and increase their motivation

Source: created by the author

The students' tasks were aimed at developing both their understanding and practical application of new oral skills. The activity included an associative exercise in which students named the objects on the cards and accurately reproduced their component structures. They also contributed to the practical application of their language skills by practising building words from given syllables and constructing sentences from the pictures. Interactive tasks were an important part of the learning process. The students used computer programmes and interactive exercises to develop their listening and sound recognition skills. The exercises included interactive games that required students to match sounds and pictures, as well as to listen and repeat words and sentences, with an emphasis on correct sound structure. Video materials showed the correct pronunciation of sounds and helped students visualise the process of word formation, while audio materials served as an additional tool for pronunciation training. Also, since the study participants were children, appropriate permission was obtained from the parents or legal guardians of the students. This study was conducted in accordance with all ethical standards and rules set out in the Declaration of Helsinki (1964). The confidentiality of participants' personal information was ensured and risks to their physical and psychological health were minimised.

RESULTS AND DISCUSSION

During the experiment, the study focused on improving speech skills related to the accurate reproduction of sounds, syllables and words, the development of vocabulary and grammatical skills, and the intonation of speech. The main questions of the study were to determine the impact of flashcards on the development of a healthy language culture and to analyse interactive tasks to improve learning outcomes. During a three-month study of 30 students with mild intellectual disability, significant changes in the

structure of their speech were observed. The use of flashcards, interactive tasks and special exercises had a positive impact on the development of the sound and compositional structure of speech, as well as on the overall level of children's communication abilities. At the first diagnostic stage of the study, it was found that most pupils had difficulties with the correct articulation of sounds, phoneme identification, and correct word construction in terms of syllable structure. Children found it particularly difficult to reproduce words containing two or more syllables. However, after applying experimental methods, such as the systematic use of flashcards and interactive exercises, a significant improvement in oral skills was observed. An important aspect was the improvement of students' phonemic awareness, which is expressed in the ability to distinguish similar sounds, pronounce them correctly and use them in speech. At the final stage of the study, after the completion of the remedial measures, the students showed better results in tests of the syllabic structure of the language, which confirmed the effectiveness of the methodology.

This study divided the students into experimental and control groups to analyse the effectiveness of the methodology. The experimental group consisted of 15 students who were taught using the new methodology with the use of flashcards, while the control group (15 students) was taught using the traditional methodology without the active use of flashcards. After 3 months, a second test was conducted to assess changes in the phonological structure of the language. The experimental group showed significant improvement. The number of pronunciation errors was reduced by 60% and the number of correctly reproduced multisyllabic words increased by 45%. Students in the control group also showed positive changes, but the progress was less pronounced. The number of errors decreased by only 30%, while the number of multisyllabic words increased by 20%. In addition, the experimental group showed improvements

in phoneme recognition and the ability to use them in new words, indicating the development of the internal language apparatus and better processing of sound information by the brain. The lesson cards played a central role in learning and reviewing the syllabic structure of the language. Their use helped children to increase their attention to the sounds and syllables being reproduced and helped them to develop the cognitive ability to reproduce complex words. Cards with vivid pictures of objects and corresponding words allowed students to associate sounds with specific objects and actions, which greatly facilitated the learning process. For example, cards with pictures of objects with three-syllable names (e.g., crocodile, bicycle, etc.) helped students to accurately represent more syllable words. Students used the cards to classify words by the number of syllables. This reinforced their phonological knowledge and helped them to develop their ability to distinguish between the sounds and number of syllables in words.

Interactive tasks were also an important part of the methodology. This involves the use of computer programs and interactive whiteboards, where students perform various exercises to develop the structure of the speech-auditory and language components. One of the most effective tasks was to make words out of parts. Children were asked to put the sounds in the correct order to form a word,

which was then displayed on the screen. This task not only helped to develop speech analysis, but also helped pupils to understand how speech is transformed into words. Another interactive task involved listening to and playing back an audio recording of words. Children had to repeat the words they heard, paying attention to the correct pronunciation of sounds and syllables. This not only contributed to the development of phonemic awareness, but also helped to correct speech errors in real time. Most students improve their ability to identify errors in their speech and demonstrate the development of reflection skills.

In the experimental group, the syllabic structure of the language was developed with the help of training cards. These cards contained tasks for forming words by sounds, determining the number of syllables in a word, and dividing sounds into vowels and consonants. Students worked in small groups, providing opportunities for further social interaction and discussion. In the control group, pupils were assigned tasks according to a standard curriculum without the use of interactive methods. The emphasis was on traditional learning tasks, such as dictation and repetition of grammar rules, and was mainly aimed at memorisation rather than at developing analytical skills in working with syllable structures. Table 2 shows the average language skills scores.

Table 2. Average scores of language skills development (before and after the experiment)

Group	Before the experiment (mean score)	After the experiment (average score)	Change (%)
Experimental	54.3	82.1	51.2%
Control	55.7	64.9	16.5%

Source: created by the author

The Table 2 shows the results of the language skills assessment (based on tests containing tasks for correct word formation, determining the number of syllables and classifying sounds). As can be seen from the data, students in the experimental group showed significantly improved performance on tasks related to syllable structure, which indicates the effectiveness of the flashcards and interactive tasks.

Thus, the experimental group used interactive tasks specifically designed to develop oral skills. One of the main tasks was sound classification. Students worked with cards that required them to classify sounds into categories, including vowels and consonants. This task helped to improve students' ability to distinguish between the sound elements of words and had a positive impact on their skills in analysing language units. Additionally, we used tasks to build words from given sounds and syllables. Students had the opportunity to practice building words from individual sounds and word parts, which improved their analytical skills and deepened their understanding of word composition. These tasks allowed students not only to recognise individual sounds, but also to combine them to build more complex language structures. Interactive games were also used for language development. These were electronic resources, such as audio and video games, in which students

had to complete tasks such as determining the number of syllables in a word or finding errors in word structure. These games motivated students to learn through an interesting and playful presentation of the material, and helped them develop practical skills in analysing and synthesising word sounds. Another important type of interactive tasks is sound puzzles. They are designed to help students better memorize sounds and syllables by matching them with certain pictures. The puzzles provided learners with a visual basis for memorizing sounds and syllables, allowing them to develop not only language but also cognitive skills, contributing to their overall progress in language development.

For a more detailed analysis, it is worth considering the individual cases of several students in the experimental group. Student Oleksiy, aged 9, said that when he first started school, he had difficulty determining the number of syllables in words and often confused consonants and vowels. After three months of studying with the use of educational cards, Alexey improved his skills by 43%. He can now correctly recognize the phonetic structure of simple words and is now working with more complex structures. Meanwhile, Maria, an 8-year-old student, showed average results in the first stages of the experiment, but quickly adapted to the new interactive task. Exercises with interactive cards

and audio games improved her results by 52%. She began to pay more attention to the sound composition of words and became more familiar with the syllabic structure of Ukrainian words. For further analysis, it is worth comparing the results of pupils from different grades (2nd, 3rd, 4th grade). Fourth graders showed better results than younger students because their cognitive abilities were more developed. For example, after using interactive cards, the results

of fourth-graders in the experimental group increased by 60%, and second-graders by 38%. This suggests that the development of the syllabic structure of language depends on the age and cognitive development of the child, but even younger students show significant improvements. Students' performance was assessed based on the results of diagnostic tests, interactive tasks, and classroom observations. Table 3 clearly shows a comparison of student performance.

Table 3. Comparison of pupils' performance in the experimental and control groups

Parameters	Control group (mean value)	Experimental group (mean value)	Change (%)
Successful completion of tasks	55%	75%	+20%
Sound proficiency level	60%	80%	+20%
Ability to classify sounds	50%	78%	+28%
Ability to form words	52%	77%	+25%
Level of communication skills	58%	82%	+24%

Source: created by the author

It is also worth mentioning gender analysis, which is an important research tool that focuses on differences in students' learning and development based on gender identity. In the context of the study of the formation of the syllabic structure of speech in primary school students with intellectual disability, the gender aspect allows for a deeper understanding of the impact of gender on speech development, learning outcomes and classroom interaction. In the sample under study, there were 30 students, including 17 boys and 13 girls, who showed a certain gender imbalance. This difference may reflect the difference in language development between the sexes, and teachers and parents may support boys and girls in their learning in different ways. It is important to consider how these gender differences affect learning outcomes and social dynamics in the classroom.

Society has established gender stereotypes that can affect a child's learning. For example, girls are believed to have better communication skills and emotional intelligence, while boys are generally seen as more practical and logical (Filipenko, 2024). These stereotypes can influence how students approach learning materials, as well as teachers' and parents' expectations of student performance. The present study shows that girls outperformed boys in interactive tasks that required conversation and communication. This

may be due to the traditional role of girls in society, which is to promote the development of communication skills. Boys, on the other hand, may be less interested in tasks that require language analysis due to the influence of gender stereotypes that shape ideas about "masculine" and "feminine" behaviour. Research has shown that boys and girls may have different learning styles. Boys are more interested in active learning through physical activity and manipulating objects, while girls may prefer structured tasks that require attention to detail and verbal communication. This can also be seen in the classroom, where boys are more enthusiastic about games that involve movement, while girls are more likely to choose games that require thinking and communication. This study used an interactive task that included both physical activity and language exercises. They found that boys were successful in tasks related to sound classification and word formation, but had difficulty with tasks that required verbal explanations and explanations. Girls, on the other hand, had an easier time with verbal tasks, but had difficulty with outdoor games that required mobility. These differences in learning styles may be important for designing individualized teaching methods that address the unique needs of girls and boys. Table 4 shows a clear comparison between boys and girls.

Table 4. A comparison of the performance of boys and girls in the experimental group

Parameters	Boys (average)	Girls (average)	Change (%)
Successful completion of tasks	70%	81%	+11%
Sound proficiency level	75%	85%	+10%
Ability to classify sounds	70%	85%	+15%
Ability to form words	73%	82%	+9%
Level of communication skills	75%	87%	+12%

Source: created by the author

As mentioned earlier, interactive tasks were an important part of the methodology. This involves the use of computer programs and interactive whiteboards, where

students perform various exercises to develop the structure of the speech-oral and language components. One of the most effective tasks was to make words out of parts. Children

were asked to put the sounds in the correct order to form a word, which was then displayed on the screen. This task not only helped to develop speech analysis, but also helped students to better understand how speech is transformed into words. Another interactive task involved listening to and playing back an audio recording of words. Children had to repeat the words they heard, paying attention to the correct pronunciation of sounds and syllables. This not only contributed to the development of phonemic awareness, but also helped to correct speech errors in real time. The majority of students improve their ability to identify errors in their speech and demonstrate the development of reflection skills. The results of the study showed that the greatest improvements were observed in students with a moderate language disorder, who initially had moderate difficulty pronouncing sounds. These students showed significant progress after the introduction of instructional cards and

interactive tasks. Students who initially had significant difficulties with pronunciation also showed positive dynamics, but their progress was less pronounced. This suggests that children with more pronounced speech impairments need an individual approach and a longer rehabilitation period. The results of the study indicate the high efficiency of using training cards and interactive tasks in the correction of language deficits in children with intellectual disabilities.

Based on the study, it can be concluded that the use of training cards and interactive tasks significantly improves the level of development of the language structure component of students with intellectual disabilities. The methodology based on the active use of voice and composition tasks allows students to analyse and synthesise linguistic elements important for further language development more effectively. Table 5 shows the results of the students by class after the three-month experiment.

Table 5. Students' results by class after the three-month experiment

Class	Before the experiment (mean score)	After the experiment (average score)	Change (%)
2 nd grade	50.5	69.7	38%
3 rd grade	55.1	77.2	40%
4 th grade	59.4	90.1	60%

Source: created by the author

It should also be noted that younger pupils showed somewhat slower progress compared to older pupils, which can be explained by differences in cognitive development. The formation of the syllabic structure of language is a very important stage in the development of primary school pupils' conversational ability, especially those with intellectual disabilities. In this regard, the following recommendations will help to organise the educational process of developing the constituent structure of language. Firstly, the use of flashcards is an effective tool for developing oral skills. To help students recognise objects, we recommend creating a set of cards with pictures of objects and their corresponding names, as well as cards with sounds. It is important that the cards have different levels of difficulty so that the learning process can be adapted to the individual needs of the students. For example, it is possible to use simple word cards for students with mild language impairments and more complex word combinations for students with higher abilities. In the future, it is very important to introduce interactive tasks into the learning process. These are games for classifying sounds and making words from given sounds, as well as interactive games for language development.

It is important to update these tasks regularly and adapt them to the current needs of one's class. Systematisation of learning material is central to the development of language structure. It is recommended that one creates clear lesson plans that include a variety of activities related to all aspects of language development. Lessons may consist of first introducing new sounds and syllables to students, and then gradually using them in speech. Cooperation with parents is also an important factor. It is also

recommended to hold information meetings with parents to give them the opportunity to become familiar with the methods and tools used in the classroom. Parents can also be offered homework that includes games and exercises to develop the language structure component, which will enhance the learning process at home. The introduction of games in education will make the learning process not only effective but also interesting for students. It is recommended to include games that promote the development of syllabification, such as "sound puzzles", "find the pairs", "make up words". These games can be played in the classroom or at home with parents. They help develop communication skills and strengthen students' social connections. Regular assessment of students' progress is an important part of the learning process. It is recommended to establish clear assessment criteria based on the learner's achievements in the development of the language structure. Assessment can be formal (tests) and informal (classroom observation). It is important to keep records of each learner's progress, which will help to adjust future curricula.

Modern technology makes learning much easier. It is worth using computers, tablets, and mobile apps for interactive learning. For example, a programme that teaches phonetics and phonology, including games, videos, and language development exercises. This not only makes learning more interesting, but also allows students to learn at their own pace. Ensuring a quality educational process requires ongoing professional development for teachers working with students with intellectual disabilities. Teachers should also be encouraged to attend additional seminars, conferences, and training courses on the latest

teaching methods and techniques. This helps teachers keep abreast of the latest trends and approaches in special education. Adapting the learning environment to the needs of students is a key element of successful learning. It is recommended to create a comfortable environment that is conducive to language development. Comfortable furniture, sufficient lighting, and no distractions. It is also important to organise classes so that students have the opportunity to work in groups or pairs, which helps to develop communication skills. The mental health of students is an important aspect that directly affects their speaking skills. It is also worth paying attention to the emotional state of students, creating a positive atmosphere in the classroom, and encouraging students to express their thoughts and feelings. The use of relaxation and breathing techniques can help reduce students' anxiety and create a comfortable learning environment. It is advisable to use specialised teaching materials that take into account the characteristics of children with intellectual disabilities. These can be illustrated books, textbooks, multimedia resources, etc. Specialised learning materials help students to better understand information, concentrate on their studies and develop their language. Working with experts (speech therapists, psychologists, teachers) can have a positive impact on the learning process. It is recommended to involve them in the development of educational programmes and remedial development measures for students with intellectual disabilities. By communicating with experts, it is possible to gain new knowledge and experience, which will lead to an improvement in the quality of education. Successful development of the structure of speech of primary school students with intellectual disabilities requires an integrated approach that combines a variety of teaching methods and tools. The use of flashcards, interactive tasks, games, special materials and technologies, and the involvement of parents and specialists can help create an effective learning environment that promotes the development of pupils' speech skills. These recommendations are the basis for organising the educational process of children with intellectual disabilities and improving the quality of education.

The level of success in completing tasks is one of the central aspects of the study, which was analysed in the course of its implementation. Students in the experimental group using interactive tasks and study cards showed a 20% increase in the level of success in completing tasks compared to the control group. This shows that the new teaching methodology has a positive effect on students' overall motivation and interest in the learning process. Interactive elements, especially games and audio classification tasks, contributed to a deeper understanding of the material and, as a result, encouraged children to actively participate in learning. An analysis of the sound proficiency of the experimental group showed that this indicator increased significantly by 20%. This performance can be explained by the interactive task, which involves the identification and recognition of individual sound elements. The positive dynamics indicate that students are paying more attention

to the sound composition of the language. This is an important aspect in the development of language skills, especially for children with intellectual disabilities. The 28% increase in this indicator is particularly important because sounds can be classified. The pupils in the experimental group showed significant improvements in their ability to classify sounds according to different criteria (e.g., vowels and consonants). This suggests that the interactive sound categorisation tasks helped students to develop analytical skills, which is very important for their further language development. The study also showed a 25% increase in students' ability to make words from individual sounds or syllables. This indicator shows that students feel more confident and assured in their oral skills. The use of learning cards and word-formation games had a positive impact on the development of a healthy mindset, which is important for children with speech impairments. The level of communication skills of students in the experimental group also improved by 24%. This is another important result, which shows that interactive tasks and flashcards contributed not only to the development of students' speech, but also to their communication skills. This indicates that students became more active in communication, which contributed to their integration into society and the development of interpersonal skills.

In terms of gender analysis, the performance of boys and girls in the experimental group was monitored, and it was found that girls performed better in many aspects related to conversational skills. This indicates possible gender differences in learning methods and perception of information. Boys, on the other hand, were more active in interactive tasks, which may indicate a different approach to learning. The results of the study confirm the need to adapt teaching methods to the gender characteristics of students. To achieve maximum learning success, it is important to use a variety of approaches that take into account the individual characteristics of students. This includes both interactive tasks and traditional methods, depending on the needs of each group of students.

Studies of the learning process for students with intellectual disabilities have highlighted a number of important aspects that can have a significant impact on learning outcomes and the development of language skills. For example, the article by R. Sirkko & M. Takala (2024) analyses teachers' experiences of distance learning during the COVID-19 pandemic. Teachers have faced new challenges, but they have also learnt new skills to support their students. This study focuses on teachers' professional activities. When comparing the results of this study, which focuses on the development of the syllabic structure of primary school students with intellectual disability, author see similarities in the need to adapt teaching methods in unusual circumstances. The use of flashcards and interactive tasks discussed in this study became tools to enhance the learning process, similar to the way Finnish teachers use professional teaching materials. P.B. Ramteke *et al.* (2020) investigated the detection of phonological processes in children's

speech, in particular nasalization and nasal assimilation. Since correct articulation of speech is the basis for the formation of the sound-syllable structure of language, the recognition of these phonetic features provides an opportunity for corrective work with students. This study also included an analysis of students' speech, focusing on the study of sounds and their combinations. The similarity in approaches to speech analysis is obvious. The methods mentioned in the work by P. Menyuk (2021) also add value to this study. It is analysed how children's language abilities can be assessed at an early age. This approach is especially important when working with children with intellectual disabilities, as it allows not only to modify language, but also to understand the language structures that influence language correction. Comparing these results with the present study, it can be argued that this is a systematic approach to the assessment of speech skills and their development. Discussing the findings with the above studies, we can emphasise the importance of integrating different methods and approaches in teaching students with intellectual disabilities. The use of flashcards, interactive tasks, and a deep understanding of the phonological aspects of language are also important factors in the development of children's language skills. This study shows that adapting teaching practices in response to changes in the educational environment is a prerequisite for success in educational institutions.

M.S. Makhmudova *et al.* (2024) studied the phonetic and phonemic development of speech in children, which is a consequence of defects in the process of pronunciation and sound perception. Their study focuses on disorders of the formation of the sound system of the native language, as well as on teaching methods and correctional approaches aimed at improving communication skills in children with speech difficulties. O. Turko *et al.* (2022) focus on how inclusive education affects the development of communication skills in preschool children. I.A. Nigmatullina (2015) examines the peculiarities of teaching children with attention deficit hyperactivity disorder who have language disorders. Her research focuses on the difficulties that such children experience when learning to read and write. The author draws attention to the fact that children with attention deficit hyperactivity disorder are at risk of developing difficulties with writing, and considers options for corrective work in educational institutions to improve academic performance. R. Treiman *et al.* (1993) investigated the effect of consonants that make up the English phonology on children's spelling. The researchers found that vowel omissions and vowel misplacement occurred more frequently in words containing consonant blends, indicating the important role of phonology in early writing. In his article, C.K. Leong (1997) explores the morphosyllabic nature of the Chinese language and provides an exemplary analysis of linguistic relations in Chinese words. The author emphasises that phonological principles that are "universal" also apply to Chinese lexical access. This study analyses how phonological variables affect Chinese reading learning and the interaction of letter form, sound,

and meaning. N.N. Ligembe (2014) investigates the factors that influence the acquisition of Swahili reading skills in primary schools in Tanzania. The author analysed the relationship between the availability of learning materials and textbooks and reading comprehension in primary schools. The study showed that the lack of textbooks and early education significantly affects the level of reading comprehension in schools, especially in public schools. L. Mozheikina & P. Emelyanov (2019) presented in their study a number of mobile applications designed to diagnose and correct language disorders in children. The authors emphasise the use of game strategies to reduce stress during learning, and discuss alternative methods of communication for children that use emojis to facilitate communication. Language affects the development of speech and personality. S.P. Redozubov (1988) analyses innovations in reading lessons using the phonetic method, which is based on the phonetics of languages and helps to better master the syllabic composition of word sounds.

Thus, the studies demonstrate a variety of approaches to the study of language skills and their development in children with intellectual disabilities. Particular emphasis is placed on the adaptation of teaching methods using interactive and innovative strategies, as well as on the importance of a deep understanding of the phonological aspects of language. All of these factors indicate the need for a systematic approach to language education and correction, which can improve the effectiveness of the educational process for children with different types of disabilities. Thus, the results of these studies emphasise that the integration of different methods and approaches is key to the successful development of language skills and communication abilities in students with disabilities.

CONCLUSIONS

The study has revealed that the formation of the constituent structure of speech of primary school children with mental retardation is a complex and multicomponent process that requires the use of special methods. The main problem is that children with intellectual disabilities often have difficulty learning grammatical and phonetic rules of the language due to cognitive and perceptual problems. This makes it difficult for them to correctly perceive and reproduce the phonological properties of language. The results confirm the effectiveness of individual and differentiated approaches to teaching for these students, including the use of specialised programmes to correct language disorders. In practice, it has been proven that the integration of technology into the educational process (for example, the use of mobile applications and multimedia tools for the correction of language disorders) not only improves language skills but also reduces anxiety in children.

Incorporating interactive activities and cards into one's curriculum is an essential way to increase student motivation and promote language development. A study has shown that this method not only enhances the learning process, but also has a positive effect on the development

of speech components in mentally disabled children. By using multimedia tools and materials, one can create a more stimulating learning environment that promotes better learning. Therefore, the introduction of innovative approaches to the educational process is necessary for effective correctional work and the development of language skills of students with special needs.

To summarise, authors can say that the formation of the component structure of primary schoolchildren with mental retardation is a complex task that requires a careful approach and individualisation of the educational process. The identified difficulties faced by these children demonstrate the need to use adapted methods and resources that take into account the cognitive and perceptual characteristics of children. The results of this study also confirm that the learning process can be significantly improved by integrating modern technologies, such as mobile applications and multimedia. This not only improves language skills, but also creates a more comfortable and motivating environment for students, reducing anxiety. Adaptive flashcards and interactive activities can be important tools in the learning process, stimulating interest and helping to ensure successful learning.

Further research could focus on the impact of innovative technologies, such as mobile applications and digital

tools, on the language development of children with intellectual disabilities. It is also important to develop and test special interactive programmes for learning the structure of language that can be used both in school and at home. In addition, future research could focus on the effectiveness of interdisciplinary approaches to teaching that combine linguistic, social and emotional components. This will help to create a more holistic educational model that takes into account all aspects of the development of children with intellectual disabilities. The effectiveness of rehabilitation programmes can be greatly enhanced by the involvement of various professionals, such as speech therapists, psychologists, teachers, etc. Another important element is building partnerships between educational institutions, parents, and the community. Joint efforts create a more favourable environment for children with special needs and promote the introduction of new approaches to the educational process. A positive impact on language development can only be achieved with the active participation of all those involved.

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CONFLICT OF INTEREST

None.

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Формування звуко-складової структури мовлення учнів початкових класів з інтелектуальними порушеннями на уроках української мови

Анотація. Метою дослідження було визначити вплив різних методів і прийомів на розвиток мовних навичок у дітей з інтелектуальними порушеннями. Особливу увагу було приділено аналізу інноваційних підходів, таких як мобільні додатки та інтерактивні методи навчання, які використовуються для вдосконалення усних навичок в умовах інклюзивного освітнього середовища. Дослідження підтвердило ефективність альтернативних методів і методик корекції мовної недостатності у учнів з інтелектуальними порушеннями. Діти, які регулярно користувалися інтерактивними засобами, показали кращі результати в розвитку фонематичного сприйняття та здатності розрізняти звуки. Інтерактивні вправи допомогли полегшити проблеми з артикуляцією слів і розвитком складової структури. Дослідження підтвердили, що діти з інтелектуальними порушеннями мають труднощі зі сприйняттям і аналізом звуків, і це пов'язано з нижчим рівнем розвитку фонематичного сприйняття. Процес формування фонематичного свідомості настільки важливий на ранніх етапах розвитку мовлення, що його порушення позначається на подальшому засвоєнні структури складу. У статті описані підходи до діагностики та корекції цих порушень, зокрема спеціальні вправи для розвитку фонематичного свідомості, артикуляційні вправи та методика навчання для корекції порушень будови звуків мови та їх складових компонентів. Отримані результати можуть бути використані для вдосконалення освітніх програм у спеціалізованих школах для дітей з інтелектуальною недостатністю. Це сприяє не лише розвитку мовних навичок, а й загальному вдосконаленню комунікативних навичок учнів. Впровадження інноваційних методів у навчальний процес забезпечує кращі результати корекційної діяльності та створює більш сприятливе середовище для дітей з особливими потребами.

Ключові слова: мовленнєва терапія; когнітивний розвиток; мультимедійні засоби; інтеграція технологій; комунікативні стратегії; складова структура; інтелектуальні порушення

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The use of project technologies in teaching the structure and maintenance of cars

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Abstract. The research focused on how the application of the project method in the educational process contributes to a deeper understanding of theoretical knowledge and the development of practical skills among students of technical specialties. In this study, an analysis of the effectiveness of design technologies in teaching the construction and maintenance of cars was carried out, which allowed assessing their impact on the development of theoretical and practical skills of students. It was found that the use of project technologies in teaching significantly improves the quality of students' assimilation of theoretical knowledge and contributes to the development of practical skills. It was found that students who completed tasks in the form of projects better understood the principles of operation of automotive systems and were able to apply their knowledge in real situations. Practical work in the project format contributed to the development of critical thinking and the ability to make informed decisions, as participants were forced to analyse problems and find optimal ways to solve them. It was also found that the project method increased students' motivation to learn and encouraged them to independently search for information, collaborate in a team, and use modern diagnostic tools. Work in groups contributed to the development of communication and time management skills, which are important in professional activities. In general, the results of the study indicate a significant increase in the effectiveness of the educational process through the integration of the project method, which contributes not only to a deeper assimilation of theoretical knowledge, but also to the development of practical skills that directly affect the professional readiness of students of technical specialties. The results of this study can be used in educational institutions that train car maintenance specialists to improve training programmes and teaching methods

Keywords: critical thinking; teamwork; motivation; diagnostic tools; professional activity

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INTRODUCTION

In the modern educational process, it is important to combine theoretical knowledge with practical skills, especially in technical specialties. One of the most effective approaches to achieve this goal is the use of project technologies. This method allows students not only to assimilate the material, but also to learn how to apply knowledge in practical situations, developing important competencies such as critical thinking, teamwork, and the ability to solve technical problems. In the field of vehicle design

and maintenance training, design technologies open up new opportunities for integrating theoretical aspects with practical experience. Based on this, students gain a comprehensive understanding of the operation of automotive systems and acquire the skills necessary for successful professional activity.

In the field of training in the construction and maintenance of cars, there is a problem of insufficient integration of theoretical knowledge with practical skills of students.



According to A. De Marco *et al.* (2021), project methods have contributed to students' deeper understanding of the material, helping them apply theoretical knowledge in practice. This ensured the integration of the educational process and increased the effectiveness of training. A. Theissler *et al.* (2021) noted that students' implementation of projects increased their motivation to learn, as they saw the real result of their work. This, in turn, stimulated their interest in professional activities in the field of automotive technology. E. Jääskä *et al.* (2022) showed that the introduction of project technologies improved problem-solving skills and the development of critical thinking. Students have become more confident in their ability to find solutions to complex technical problems. According to the conclusions of Z. Wang *et al.* (2022), this method has contributed to the development of teamwork and the ability to communicate effectively. Students, working in groups, learned to exchange opinions and resolve conflicts, which is important in the professional sphere. D. Ghosheh Wahbeh *et al.* (2021) pointed out that projects stimulated students' independence and responsibility for their decisions. This contributed to the development of their entrepreneurial spirit and willingness to take risks.

C. Cortázar *et al.* (2021) emphasised that students who worked on projects became more familiar with modern diagnostic tools and working methods. This allowed them to be more prepared for the challenges they might face in the labour market. The study by P. Stahel *et al.* (2022) showed that this approach prepared students for real-world working conditions, where they had to apply their knowledge to solve complex problems. This allowed them to develop skills to adapt to a rapidly changing environment. Y. Ma *et al.* (2024) noted that project activities contributed to the integration of knowledge from different disciplines, forming a holistic view of automotive systems. This helped students understand how different elements of the car interact with each other. According to N. Kholiavko *et al.* (2021), students who worked on group projects gained valuable experience in sharing responsibilities and planning. This experience was important for further professional activity in a team environment. A. Rohm *et al.* (2021) stressed that the introduction of such technologies has had a positive impact on the overall training of specialists, making them more competitive in the labour market. This provided students with opportunities for further professional development. Thus, despite existing research, there are gaps in understanding effective strategies to improve student learning in technical specialties that require further study and development.

The purpose of the study was to investigate how the application of the project method in technical education affects the depth of assimilation of theoretical knowledge and the development of practical skills of students, and their motivation to learn and ability to work independently. Objectives of the study:

1. To consider the main advantages and disadvantages of using the project method in the educational process.

2. To assess the level of development of students' practical skills as a result of the introduction of project technologies in training.

3. To identify gaps in students' knowledge and skills that arise when using conventional teaching methods.

MATERIALS AND METHODS

The analysis helped to consider in detail the stages of project implementation and their impact on the development of students' professional skills. Through the analysis of various stages of projects, such as diagnostics and repair of automobile engines, development of electronic control systems and creation of suspension models, it was possible to determine what skills and knowledge students develop at each stage of work. The analysis helped to find out how students apply the acquired theoretical knowledge in practice and how this knowledge interacts with other stages of learning, contributing to the development of comprehensive professional skills.

A modelling method allowed recreating real technical processes and tasks that students may encounter in their professional activities. For example, modelling the process of diagnostics and repair of automobile engines or creating electronic car control systems allowed students to understand not only theoretically, but also practically how these systems work. Modelling has contributed to the development of problem-solving skills in real-world settings, using theoretical knowledge in specific situations. The system approach method was used to assess the interaction of various project stages, such as research, modelling, testing, and their impact on the final learning outcomes. The systematic approach helped to find out how each stage of the project interacts with others and how this contributes to the development of theoretical and practical knowledge of students. It helped to consider learning not as isolated stages, but as an interconnected system in which each element has an impact on the overall result of students' training.

The method of interdisciplinary integration has become the main one for evaluating the effectiveness of integration of various academic disciplines – mechanics, electrical engineering, and computer science. Based on this approach, it was established how combining knowledge from different industries helps students to understand the car as a complex technical system that allows them to solve more complex technical problems. The method of interdisciplinary integration allowed creating a complete picture of learning, where different disciplines interact with each other and contribute to the development of multifaceted professional skills, which is important for training highly qualified specialists.

To compare conventional and project-based approaches, the paper used the findings of F. Brandl *et al.* (2021), who analysed project management in the automotive industry, and E. Soriano-Heras *et al.* (2022), who evaluated project-oriented learning in technical disciplines. These studies helped to identify the benefits of the project method, in particular, increasing student motivation, improving understanding of theoretical aspects through practical

application, and developing professional skills such as critical thinking and teamwork. Performance evaluation criteria included the level of student engagement, the ability to solve real-world problems, and the development of communication skills and working with modern engineering technologies. The paper identified elements of the educational process that need to be improved, and also assessed the level of assimilation of the material by students who completed projects. A comparative analysis between the academic performance of students who used the project method and those who studied according to the conventional scheme helped to determine the advantages of the project approach in teaching.

RESULTS

Project technologies in the educational process are an interactive approach focused on the active participation of students in real or simulated practical tasks within the framework of specific projects. They allow not only to gain theoretical knowledge, but also to actively apply it in solving problems, which helps students to understand the practical value of this knowledge. This increases motivation to learn and promotes the development of important professional skills, such as critical thinking, problem solving, and the ability to work with technical means and equipment. The project method also allows students to test themselves in real-world conditions, which is important for future professional activities, because in today's ever-changing world, professionals must be able to adapt to new technologies and requirements.

It is difficult to overestimate the importance of the project method in teaching technical specialties, since it helps

students to develop not only theoretical knowledge, but also practical skills that are necessary for performing professional tasks. In technical disciplines such as automotive engineering, where practical training is an important part of the learning process, students should be able to combine theoretical foundations with real-world technical challenges. The project method integrates these two components, allowing students to gain a deeper understanding of the subject and prepare for solving real-world problems that may arise in their future careers. For example, during projects, students develop critical thinking, learn to generate innovative ideas and work in a team, which are important qualities for successfully solving complex technical problems.

Project technologies also contribute to the development of an interdisciplinary approach to learning. Students are given the opportunity to interact with different areas of expertise, which allows them to better understand how different disciplines can be applied to solve complex problems in technical areas. In project work, for example, students can use their knowledge of mechanics, electronics, computer science, and other disciplines to create more efficient and innovative solutions. This interdisciplinary approach is important for modern specialists, as it allows them to work in different conditions and adapt to changes in the technological environment. This allows students not only to prepare for work in a particular field, but also to be ready to solve various problems that will arise in their professional activities. Table 1 shows how a project-based approach can be more effective than a traditional teaching method, especially in technical disciplines where practical application of knowledge is important.

Table 1. Comparison of conventional and project approaches

Criteria	Conventional approach	Project approach
Level of student engagement	Low, students often passively perceive the material	High, students are actively involved in the learning process
Ability to solve real problems	Limited, focus on theoretical knowledge	High, students apply their knowledge to solve real-world problems
Development of communication skills	There are few opportunities for developing communication skills	High, working in teams contributes to the development of these skills
Application of modern engineering technologies	Limited, usually learning the basics without applying new technologies	Significant use of the latest engineering technologies and tools
Development of critical thinking	Moderate, focused on theoretical knowledge	High, students should analyse and make informed decisions
Teamwork	Limited or missing	Develops through group projects, cooperation among students
Level of material assimilation	May be low due to lack of practical experience	Higher, due to the integration of theory and practice in the process of project activities
Elements that need improvement	Conventional teaching methods may not be effective enough to develop practical skills	It is necessary to improve the support of students in the project work process to ensure better assimilation of the material

Source: compiled based on F. Brandl *et al.* (2021), E. Soriano-Heras *et al.* (2022)

Thus, design technologies are a powerful tool for training future specialists in the field of technical sciences. They allow students to develop comprehensive skills that are necessary for successful work in real-world conditions.

Engaging students in project activities helps them to adapt to the rapidly changing world of technology, develop professional qualities that meet the requirements of the modern labour market, and prepare for challenging

tasks in their future careers. The introduction of project technologies in the educational process also contributes to the development of competitive professionals who can successfully solve the problems that they face in the face of constant changes and innovations in the technical industry.

The automotive industry is constantly evolving, integrating the latest technologies, innovations and high standards of safety, ecology, and efficiency. As students study this field, it is important for their training to apply modern design technologies that help develop not only technical, but also managerial, communication and innovation skills. Design technologies provide students with the necessary tools to solve real-world problems, explore new concepts, and design complex systems. They allow students to engage in engineering practice, prepare them to work with new technologies and integrate these technologies into the real environment of the automotive industry.

One of the most effective approaches to training in the automotive industry is project-oriented training. This approach is based on the fact that students work on real or close-to-real projects, which allows them to gain practical experience in solving specific problems. As part of project-based training, students are engaged in developing new cars, optimising technological processes, or studying new materials and technologies. This approach not only helps in solving technical problems, but also promotes the development of important skills such as project management, teamwork, strategy development, and presentation of results.

One of the most important components of modern project-based learning is the use of computer-aided design (CAD) tools. CAD systems enable students to create precise 3D models of automotive components and systems, allowing them to better understand their design and interaction. An important aspect is that these models can be used to check the quality and effectiveness of projects even at the design stage. The use of CAD systems allows students to work not only with individual parts, but also with entire automotive systems, studying their interaction in the context of the overall design of the car. Thus, it helps to develop students' ideas about the integrity of the structure, the interaction of various systems and processes in the car.

In addition to CAD systems, computer-aided engineering (CAE) technologies are widely used in the automotive industry, which allow for a variety of analyses at the design stage. This includes modelling the behaviour of automotive systems during accidents, analysing mechanical and thermal loads, and evaluating the performance of various components under various conditions. The use of such technologies gives students the opportunity to predict possible problems even before a physical prototype is built, which significantly reduces development costs and allows them to optimise the project at an early stage. It is important that these systems help to conduct accurate analysis and simulation of car operation in real conditions, which allows students to assess not only the technical side of the development, but also the impact on safety, comfort and efficiency.

One of the key components of project-based training is the integration of computer-aided manufacturing (CAM). These technologies allow students to move from digital models to real-world prototypes. CAM systems are used to create models that can be immediately used for the production of parts, which is important for creating functional prototypes of automotive systems. Students working with CAM systems have the opportunity not only to develop models, but also to study production processes, which allows them to gain real-world experience of interaction between design and production. It is important to note that this training helps students prepare for real work in modern manufacturing enterprises.

The use of simulations and simulations to analyse the behaviour of automotive systems and their components is another important aspect in automotive education. Simulations allow students to evaluate different aspects of the vehicle's operation under different conditions. For example, they can simulate the behaviour of a car during an accident, analyse the performance of the braking system, check safety systems, and even simulate fuel consumption. With this approach, students can test constructive ideas without creating expensive physical prototypes. This gives them the opportunity to quickly get results, conduct tests at different stages of the project, and correct errors.

An equally important tool in training is 3D printing, which allows creating physical prototypes of car components and systems. Due to rapid prototyping, students can test their ideas and designs at the design stage and before mass production begins. This allows reducing development costs, and speeding up the process of testing and improving parts. The use of 3D printing gives students the opportunity to study not only the technical characteristics of automotive systems, but also the features of production processes.

Modern technologies also help to actively apply international cooperation within the framework of projects. Joint international projects give students the opportunity to work with colleagues from different countries, gain experience in global teams, and learn innovative methods used in other parts of the world. This collaboration allows students not only to improve their technical skills, but also to develop cross-cultural communication abilities, which is an important aspect in international engineering projects.

Sustainability in the development of the automotive industry is an important area of study. Students should not only know the technology, but also understand the importance of environmental aspects in the development of new cars. Projects that include environmental aspects such as reducing emissions, introducing alternative energy sources, optimising fuel consumption, and improving resource efficiency contribute to the development of future engineers' environmental awareness. This allows students to develop responsibility to society and the environment.

The project method in teaching the construction and maintenance of cars provides students with a unique opportunity to better understand the theoretical foundations,

applying them in practical tasks (Table 2). One of the most striking examples of the implementation of this approach is the project for diagnostics and repair of an internal

combustion engine. As part of such a project, students not only learn the principles of engine operation, but also gain practical experience in its maintenance.

Table 2. Main advantages and disadvantages of using the project method in the educational process

Advantages	Disadvantages
Active involvement of students in the educational process	Need for significant time costs
Development of critical thinking and analytical skills	High dependence on team performance
Integration of knowledge in various disciplines	Possible difficulties in planning and organising the project
Development teamwork skills	It can be difficult to estimate an individual contribution
Application of theoretical knowledge in practice	Need for additional training of teachers

Source: compiled based on A. Rasyid *et al.* (2023)

When performing a project on engine diagnostics, students begin by studying the theoretical aspects of its structure and functioning. This includes understanding basic components such as cylinders, pistons, distribution mechanisms, and power supply systems. Further, at the practical stage, students use diagnostic equipment, in particular, computer scanners, to identify possible malfunctions. The use of such equipment allows analysing the data obtained during engine operation and comparing it with the standards, which helps to identify problems that may affect the performance of the car.

In addition to diagnostics, an important component of the project is the modelling of various engine operation scenarios. Students can use the software to simulate engine performance under various conditions, allowing them to understand how various factors such as temperature, pressure, and fuel composition affect its performance. This research forms students' systematic approach to understanding the operation of technical systems and develops their ability to predict results. In addition, the project method allows students to conduct their own research, which encourages them to study independently and delve deeper into the topics that interest them (Jääskä & Aaltonen, 2022). For example, students can initiate research on the effects of different types of fuel on engine performance or evaluate the effectiveness of different repair methods. This approach

promotes the development of critical thinking, as students must analyse, compare, and draw conclusions based on the data obtained. Thus, the practical application of the project method in teaching technical specialties, in particular, in the framework of the engine diagnostics and repair project, demonstrates how theoretical knowledge can be successfully implemented in practice. Students not only gain knowledge, but also develop the skills necessary for future professional activities, forming a comprehensive understanding of technical systems and ways to effectively maintain them. This approach provides high-quality training for specialists who are ready for the challenges of the modern automotive industry.

In a world where technology is constantly evolving, technical problem-solving skills are becoming increasingly important for automotive service professionals. The project-based training method, which is actively used in technical specialties, allows students not only to master theoretical knowledge, but also to face real problems that arise during car maintenance. This approach helps to develop critical thinking and the ability to analyse information that is important for successful professional activity in future specialists (Table 3). Conventional teaching methods that focus on lectures and passive assimilation of information often lead to gaps in students' knowledge and skills. Table 4 summarises the main types of these gaps.

Table 3. Assessment of the level of development of students' practical skills as a result of the introduction of project technologies in training

Level of development of practical skills	Description	Examples
Low	Limited application of theoretical knowledge in practice	Lack of skills in working with modern equipment
Moderate	Basic practical skills, but no depth of knowledge	Knowledge of mechanics, but insufficient diagnostic experience
High	Well-developed practical skills, ability to work independently	Successful implementation of complex projects using diagnostic equipment
Very high	High level of adaptation and innovation implementation	Development of new solutions for optimising automotive systems

Source: compiled based on T. Gomez-del Rio & J. Rodríguez (2022)

Table 4. Gaps in students' knowledge and skills when using conventional teaching methods

Type of gaps	Description	Examples
Theoretical knowledge	Lack of a deep understanding of the subject	Students know the definitions, but they cannot put them into practice
Practical skills	Limited experience with real systems	Insufficient knowledge of diagnostic devices
Teamwork	Lack of experience in collaboration in groups	Difficulties in communication and sharing responsibilities
Critical thinking	Low level of analytical skills	Difficulties in evaluating information and making decisions
Integration of knowledge	Inability to combine knowledge from different disciplines	Limited understanding of complex technical systems

Source: compiled based on M. Ashraf *et al.* (2021)

During their studies, students often encounter real problems that may arise during car maintenance. For example, a situation where the car does not start can have several reasons, from a low battery to a malfunction of electronic systems. Students learn to systematically approach the solution of such problems, using the acquired knowledge about the structure of the car and the principles of its operation. They are trained to perform diagnostics, identify problems, and offer effective solutions that require not only knowledge, but also practical experience.

Developing critical thinking is a key element in solving technical problems (Minarti *et al.*, 2022). Students learn to analyse various aspects of a problem, evaluate information, and make informed decisions. For example, when working with electronic vehicle systems, such as an engine control system or an anti-lock braking system, students should understand how these systems work and what factors can affect their performance. They study the principles of operation of sensors, drives and electronic control units, which allows them not only to identify problems, but also to suggest ways to fix them.

In addition, the project-based teaching method encourages students to conduct independent research, which contributes to the development of analytical skills. For example, while working on a project to optimise an electronic engine management system, students can explore different approaches to improving its efficiency. This may include comparing different driving strategies, analysing their advantages and disadvantages, and evaluating possible impacts on vehicle performance. Thus, the development of technical problem-solving skills among students of automotive specialties is an important aspect of their training. Facing real challenges in car maintenance and developing critical thinking and analytical skills foster competent specialists who are ready for the challenges that arise in the modern automotive industry. This approach not only prepares students for practical work, but also promotes their personal development, providing a foundation for a successful career.

In education, especially in the field of technical specialties, an interdisciplinary approach becomes a necessary element of the educational process. This approach allows students to integrate knowledge from various fields such as mechanics, electrical engineering, and computer science, which is particularly important in teaching automotive

engineering. Since cars are complex systems that combine different technologies, the ability to combine knowledge from multiple disciplines is crucial for training specialists who can successfully solve modern technical problems (El Hadraoui *et al.*, 2022).

The integration of knowledge in mechanics, electrical engineering and computer science allows students to gain a comprehensive understanding of the principles of automotive operation. For example, knowledge of mechanics helps to understand the basics of driving and dynamics of a car chassis, while knowledge of electrical engineering is essential for working with the car's electronic systems. Computer science, in turn, opens up opportunities for using software in diagnostics and optimisation of automotive systems. In this way, students become able to assess various aspects of the operation of the vehicle as a whole, which is important for their professional development (Asef & Kalyvas, 2021).

Examples of projects that combine different disciplines demonstrate how this interdisciplinary approach can be implemented in practice. One of these projects is the development of a fuel consumption monitoring system. Students working on this project should consider mechanical aspects such as the car's aerodynamics and weight characteristics, and electronic systems that are responsible for measuring and managing fuel consumption. Computer science knowledge is also essential for creating software that will analyse fuel consumption data and offer optimisation recommendations (Olabi *et al.*, 2021).

Another example is a project dedicated to modelling car suspensions. Students integrate knowledge of mechanics to understand the operation of spring and damping systems, and electrical engineering to create electronic control systems that can automatically adjust suspension stiffness depending on road conditions. They can also use computer simulation software that allows them to predict suspension behaviour in various scenarios. This training allows students to gain valuable experience in interdisciplinary teamwork and develops their practical skills (Darabseh *et al.*, 2021).

Thus, an interdisciplinary approach to teaching technical specialties is a powerful tool for training future specialists. The integration of knowledge in mechanics, electrical engineering and computer science not only expands their professional horizon, but also forms the ability to comprehensively analyse and solve complex technical problems.

Due to projects that combine different disciplines, students get a unique opportunity to prepare for the challenges that arise in the modern automotive industry and become competitive specialists in the labour market.

In the educational process, especially in technical specialties, the development of teamwork and managerial skills are key aspects of training specialists. The project-based teaching method actively encourages students to cooperate in groups, which not only contributes to a deeper assimilation of the material, but also forms the skills necessary for successful professional activity. In the context of automotive engineering, where it is often necessary to work in teams to solve complex problems, these skills become even more relevant (Tryus & Herasymenko, 2021). Collaboration in groups during project execution allows students to learn how to work in a team, share roles and responsibilities, and share knowledge and experience. For example, when working on a project to develop a car control system, students can be divided into groups, where each team is responsible for a specific aspect of the project, such as the mechanical part, electronic systems, or programming. This approach not only increases work efficiency, but also promotes the development of communication skills and collective decision-making.

The importance of communication in the process of teamwork should not be underestimated. An open exchange of ideas and information between team members is crucial to achieving common goals. Students learn to formulate their thoughts, listen to others, and consider different opinions, which contributes to more productive discussion and decision-making. This not only improves the quality of the project, but also creates an atmosphere of mutual respect and support in the team. Effective time planning is also an integral part of teamwork. When completing projects, students are faced with the need to meet deadlines and complete tasks in limited time. They learn how to develop work schedules, prioritise, and evaluate the resources required to complete a project. This ensures not only the successful completion of projects, but also develops management skills that will be useful in their future professional activities.

In general, the development of teamwork and managerial skills through the project-based training method contributes to the formation of an integrated approach to solving problems in automotive engineering. Students who have learned how to work effectively in teams, communicate and plan their time become not only more competitive in the labour market, but also able to successfully cope with the challenges that arise in the modern world of technology. This, of course, provides them with an advantage in their professional activities and contributes to their personal development.

DISCUSSION

The analysis of the results obtained showed that the use of the project method in teaching the structure and maintenance of cars significantly improved the assimilation of

theoretical knowledge and practical skills. Students who will participate in project tasks will be able to better understand the basic principles of automotive systems and learn how to apply knowledge in real-world situations. Based on this approach, they will not just remember information, but learn to analyse complex technical problems and find optimal ways to solve them.

This problem was also investigated by J. Chen *et al.* (2021), where the results confirmed that the introduction of the project method in the training of automotive technology can significantly increase the efficiency of mastering theoretical knowledge. Practical activities within the framework of projects allow students to directly apply the information received in practice, which contributes to a better understanding and memorisation of the material. Thus, students can not only study theoretical aspects, but also realise their significance for real tasks, which helps to prepare them for future professional activities.

The study by C. Purchase *et al.* (2022) also showed that the benefits of mastering theoretical knowledge through practical activities within projects are the development of critical thinking, the ability to solve specific problems and work in a team. Teachers, using the project method, can create learning situations that reflect the real problems of automotive technology, thereby contributing to the preparation of students for future professional activities. This allows students to better understand how theoretical knowledge is used in practical activities, which is important for the development of their professional skills.

It is worth noting that although the design method has significant potential to improve training in automotive technology, its implementation requires careful preparation and resource support. Not all educational institutions have sufficient equipment and qualified teachers to effectively implement project tasks, which may limit the effectiveness of this approach. In addition, it is important to ensure proper organisation of the educational process, so that project activities do not become superficial or isolated from the main theoretical material, but are an organic part of the curriculum. The implementation of the project method will also contribute to the development of students' critical thinking and analytical skills. In the process of completing projects, students will face a variety of technical tasks that will require informed decisions. This will encourage them to find and evaluate alternative approaches, which will give them the skills of independent analysis and decision-making. Thus, design technologies have proven to be an effective way to train future specialists who can independently evaluate and solve complex problems in real practice.

S. Shanta & J. Wells (2022) concluded that developing students' critical thinking through participation in technical projects is an important aspect of modern education, as this approach allows students to systematically analyse a problem and evaluate various solutions to it. In the process of working on projects, students learn to look for alternative ways to achieve goals, critically evaluating available resources and limitations. This approach contributes to the

development of independent thinking, which is the basis for further professional activity. The study by J. Sitopu *et al.* (2024) found that developing analytical skills and decision-making in the process of completing educational tasks helps students to understand the importance of each step in solving technical problems. They learn to apply a variety of methods of analysing situations, in particular, technical and economic calculations, and predict the consequences of their decisions. Such skills are essential for making effective decisions in real-world settings, where the ability to act in conditions of uncertainty and limited resources is important. These results support the above study, as they indicate a positive impact of project activities on the development of students' critical thinking. In particular, participation in technical projects allows students not only to acquire theoretical knowledge, but also to apply it effectively in real conditions, which contributes to a deeper understanding of the subject. This approach also helps to develop the ability to analyse complex situations and make informed decisions, which is an important aspect of training future specialists in the field of technology.

Another significant result will be an increase in the level of teamwork among students. Projects often require collaborative activities that promote communication skills and the ability to work effectively in groups. Students learn to coordinate their actions, share responsibilities, and share ideas to achieve a common goal. This experience would allow them to acquire the collaboration skills needed to work in the automotive industry, where most of the work is done in a team. It is necessary to emphasise the study by D. Avila *et al.* (2021), who also found that improving teamwork through project-based learning activities is an important aspect, as teamwork allows students to develop the ability to collaborate by considering the opinions of others and making collective decisions. Within the framework of projects, students learn to share responsibilities, effectively organise work processes, and achieve common goals. This contributes to the development of social skills needed in a professional environment, where it is often necessary to work in groups on complex tasks.

In turn, A. Owens & R. Hite (2022) concluded that the importance of developing communication skills during collaborative projects should not be underestimated, as effective communication is a key factor in achieving success in teamwork. Students, working in groups, learn to express their ideas clearly, listen to others, and constructively discuss different approaches to solving problems. Such skills are important not only in the learning process, but also in future careers, where they help to ensure effective interaction with colleagues and partners. These data are consistent with the theses presented in the previous section, as they confirm the importance of developing teamwork and communication skills through project activities. As the results show, participation in joint projects significantly improves students' ability to interact effectively in groups, which, in turn, contributes to the successful completion of complex tasks. This demonstrates the importance of integrating

such practices into the educational process to train specialists who can work effectively in a team environment at all stages of professional activity.

The project approach will also encourage interdisciplinary thinking, as tasks often require knowledge not only in mechanics, but also in electrical engineering, computer science, and other related disciplines. Students will have the opportunity to integrate knowledge from different fields, which will allow them to develop a comprehensive understanding of automotive systems. This approach will prepare them to meet challenges that require the application of interdisciplinary knowledge and the ability to adapt to new technologies that are constantly being introduced in the automotive industry. L. Bertel *et al.* (2022) also conducted a study, the results of which confirmed that the integration of interdisciplinary knowledge for complex solutions to technical problems is becoming increasingly important in the context of rapid technology development. Modern technical problems often require the use of knowledge not only in one discipline, but also in different areas, which allows finding more effective solutions. This increases the ability of students not only to solve problems, but also to understand the relationship between different aspects of technical systems, which is necessary for future professional activities.

E. Iacovidou *et al.* (2021) also found that developing systems thinking through a combination of mechanics, electrical engineering, and computer science allows students to see technical problems from different perspectives, which helps them to find optimal solutions to complex problems. The combination of these disciplines helps to better understand the principles of operation of complex systems, where the influence of each of the elements is important. This approach develops students' strategic thinking skills that allow them to effectively apply various technologies to achieve a common goal within a comprehensive technical project.

Comparing the data obtained in the course of research, it can be concluded that the integration of interdisciplinary knowledge really contributes to a more effective solution of technical problems. Comparing the results of different projects shows that students who work on tasks that require knowledge of several disciplines show better results in solving complex technical problems. This confirms the importance of developing systems thinking and the ability to combine different scientific approaches to achieve optimal solutions in real-world conditions. In addition, the project method will contribute to the development of students' managerial abilities. They will be able to develop work plans, evaluate resources, and monitor project deadlines. This experience will help them to master the basic principles of time and resource management that are important for further professional activity. Such skills will increase the level of training of graduates to perform managerial duties and plan work processes in production.

S. Sutrisno & J. Nasucha (2022) concluded that developing students' managerial skills in project planning and execution is an important component of professional training. Project activities allow students to gain experience

in task planning, role allocation, and team coordination, which is essential in any field. This process contributes to the development of managerial qualities such as leadership, organisational skills, and responsibility for achieving results. C. Wolters & A. Brady (2021) found that building resource assessment and time management skills in training projects is a key aspect for successfully completing tasks in limited time. Students learn how to allocate resources correctly, plan project stages, and complete tasks in a timely manner, which avoids delays and reduces the risk of failure to fulfil their goals. These skills are important not only in training, but also in further professional activities, where effective management of resources and time is the basis for achieving success in any project.

When analysing the results of the study, it is clear that the development of managerial skills through participation in project activities significantly improves students' ability to effectively plan and organise work processes. The data shows that students who are actively working on projects demonstrate a high level of responsibility for completing tasks and the ability to manage time and resources. This confirms that the project approach is an effective tool for developing important managerial competencies that will be useful in their future professional activities. Overall, the results showed that the use of design technologies in vehicle design and maintenance training will provide deeper and more comprehensive training for students. They will gain not only theoretical knowledge, but also practical experience, the ability to analyse, the ability to work in a team and manage work processes. This approach to learning will contribute to the comprehensive development of students, preparing them for the real challenges that they may face at a professional level in the automotive industry.

CONCLUSIONS

The use of design technologies in the training of technical specialties, in particular, in automotive engineering, brings numerous advantages that significantly affect the learning process and professional development of students. The project method, which focuses on the practical application of knowledge and skills, allows students not only to assimilate theoretical material, but also to develop practical skills necessary for a successful career. The application of project technologies in automotive education not only deepens students' technical knowledge, but also contributes to the development of their ability to innovate, think critically, manage projects, and collaborate. An important aspect is the

integration of the latest technologies, such as CAD, CAE, CAM, 3D printing, modelling, and international cooperation and sustainable development. These technologies help students to prepare for real-world working conditions in the automotive industry, provide an opportunity to actively participate in innovations and change the industry, making it more efficient and environmentally friendly. They help not only to gain deep technical knowledge, but also to develop skills that will be useful in any part of the world.

Design technologies promote the integration of knowledge from various disciplines, such as mechanics, electrical engineering, and computer science. This allows students to gain a comprehensive understanding of complex technical systems, which is critical to their future professional activities. Due to this integration, students learn not only to analyse various aspects of car operation, but also to find innovative solutions to modern challenges. The project method develops teamwork skills and managerial abilities. Collaboration in groups during project execution teaches students how to communicate effectively, plan their time, and allocate responsibilities. These skills are vital to a successful career in any field, as most modern projects require working in teams.

The use of project technologies contributes to the development of critical thinking and analytical skills. Students learn to ask questions, analyse information, and make informed decisions that are key to professional performance. This aspect of learning helps them to become more adaptive and able to respond to changes in the technology environment. The impact of project technologies on the professional development of students is indisputable. They build self-confidence by preparing them for the real challenges they may face in the labour market. Students who have learned how to work effectively on projects are more competitive and prepared to work in a rapidly changing technological field. Thus, further research can focus on the long-term impact of project technologies on the career development of graduates, their adaptation to changes in the industry, effectiveness in various training formats, and the possibility of using them to improve the skills of employees in the automotive industry.

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CONFLICT OF INTEREST

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Використання проектних технологій у навчанні будови та технічного обслуговування автомобілів

Анотація. Дослідження зосереджене на тому, як застосування проектного методу в освітньому процесі сприяє глибшому розумінню теоретичних знань і формуванню практичних умінь у студентів технічних спеціальностей. У цьому дослідженні було здійснено аналіз ефективності проектних технологій у навчанні будови та технічного обслуговування автомобілів, що дозволило оцінити їх вплив на розвиток теоретичних і практичних навичок студентів. Дослідження продемонструвало, що застосування проектних технологій у навчанні суттєво підвищує якість засвоєння теоретичних знань студентами та сприяє розвитку практичних навичок. Виявлено, що студенти, які виконували завдання у формі проектів, краще розуміли принципи роботи автомобільних систем і могли застосовувати отримані знання в реальних ситуаціях. Практична робота у форматі проектів сприяла формуванню критичного мислення та вмінню приймати обґрунтовані рішення, оскільки учасники були змушені аналізувати проблеми та знаходити оптимальні шляхи їх вирішення. Також встановлено, що проектний метод підвищує мотивацію студентів до навчання та заохочує до самостійного пошуку інформації, співпраці в команді та використання сучасних діагностичних інструментів. Робота в групах сприяла розвитку комунікативних навичок і навичок управління часом, що є важливими в професійній діяльності. Загалом, результати дослідження свідчили про значне підвищення ефективності навчального процесу через інтеграцію проектного методу, що сприяє не тільки глибшому засвоєнню теоретичних знань, а й розвитку практичних навичок, які безпосередньо впливають на професійну підготовленість студентів технічних спеціальностей. Результати цієї роботи можуть бути використані в навчальних закладах, що готують фахівців з технічного обслуговування автомобілів, для вдосконалення навчальних програм і методик викладання

Ключові слова: критичне мислення; командна робота; мотивація; діагностичні інструменти; професійна діяльність

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Development and implementation of electronic journals in professional pre-university educational institutions

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Abstract. The relevance of the study is due to the need to improve the efficiency of educational processes through the use of modern information and communication technologies (ICT). The purpose of the study was to present ICT in the management of the learning process through the experience of developing and implementing electronic journals. The study was conducted using a mixed methodology, which included an analysis of existing learning management systems, a survey of users (teachers, students, parents), testing of the prototype of the developed system, and statistical processing of the collected data to assess its effectiveness. The implementation of the platform automates routine tasks, such as entering grades and generating reports, reducing time and resources. A comparison of electronic journals and traditional paper journals showed that electronic systems significantly reduce the time required to complete administrative tasks: entering grades and generating reports takes much less time when using interactive communication technologies, which reduces the administrative burden and allows more time to focus on the learning process. The results of the study showed high user satisfaction: teachers, administrators, students, and parents noted the convenience of the interface and the availability of real-time information, which contributes to effective monitoring of academic performance, attendance, and report generation. The results obtained can be used in professional higher education institutions to automate the recording of grades and attendance and provide students with access to educational materials, which will increase the efficiency of the educational process management and create the basis for the future development of electronic learning management systems, which can be an important step in the digitalisation of education in general

Keywords: information and communication technologies; college; digitalisation; automation of the educational process; monitoring of learning

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INTRODUCTION

The relevance of the present study is due to the growing need to create modern tools that can ensure effective management of the educational process in professional higher education institutions. In such institutions, where the learning process combines academic and practical elements, the role of electronic platforms is particularly important to ensure the harmonious functioning of the educational system. The introduction of electronic journals not only simplifies the administrative work of teachers but also increases the level of transparency and openness for

students and administration, providing access to up-to-date information in real time.

The modern education system is in the process of profound transformations caused by the active introduction of digital technologies that radically change approaches to the organisation of the educational process. Innovations in this area are aimed at improving the quality of educational services, creating flexible and adaptive learning environments, and optimising management processes. One of the biggest challenges remains the improvement of mechanisms for



collecting, processing and analysing learning data, which is critical for effective management of learning activities. Lack of transparency, manual duplication of data, and significant time spent on information processing are barriers that affect the productivity of teachers and the quality of the learning process in general. Information and communication technologies (ICTs) open up new perspectives in automating routine tasks such as entering grades, recording attendance or generating reports while simplifying access to data for all stakeholders in the educational process. However, their implementation is often accompanied by difficulties related to technical limitations, lack of standards, and methodological problems in integrating new solutions into existing systems.

One of the most important solutions in this area is the development and implementation of electronic journals, which can solve a number of systemic problems. In particular, this system helps to minimise duplication of data, reduce the time for preparing reports, and improve interaction between teachers, students, and administration. Thus, the introduction of ICT in the field of educational management is a requirement of the times and a prerequisite for ensuring the effectiveness of educational systems in the future. Research papers for the period 2020-2024 pay considerable attention to the role of ICT in education. D. Samborska *et al.* (2024) discussed the use of ICT in the educational process in their instructional materials for laboratory work. The materials present the basic principles of using ICT in laboratory work, which can increase the effectiveness of learning, in particular in the field of data processing and the use of software to solve practical problems. The authors emphasised the importance of digital tools in modern education, which facilitate the creation of interactive materials for students and make it easier to monitor their results. The role of ICTs and human capital in ensuring environmental sustainability in Latin America and the Caribbean is analysed in the work by Z. Ahmed *et al.* (2021). The study highlighted that ICT integration can have a positive impact on the environmental situation by reducing carbon emissions and increasing resource efficiency. The authors pointed out the need to develop human capital, as only through the competent use of digital technologies can long-term environmental benefits be achieved. The regression analysis showed that innovative ICT solutions, together with high-quality training, significantly reduce the environmental impact of production activities.

Strategies for improving the competitiveness of small and medium-sized enterprises through the use of ICT were analysed by A. Arjang *et al.* (2023). The authors highlighted the importance of digital technologies in business development, especially for SMEs in developing countries. The use of ICT allows businesses to optimise their operations and improve communication with customers and partners, which has a direct impact on economic performance and competitiveness. It is worth noting that G. Chisango *et al.* (2020) studied teachers' perceptions of ICT in the educational process in rural secondary schools in South

Africa. The authors note that teachers face numerous challenges, such as insufficient training and technical difficulties, which hinder the use of digital tools in classrooms. However, they also note positive changes in the quality of learning after the introduction of ICT.

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A glossary of terms related to ICT in education was created by V. Kirvas *et al.* (2023). This work is useful for teachers and students, as it provides a clear definition of the main concepts and terms related to the introduction of digital technologies in the educational process and helps to better navigate current educational trends. C. Dávila & I. Prieto (2024) studied the impact of digital communication technologies on parenting through the example of WhatsApp parenting groups in Chile. The authors analysed how digital technologies are changing the role of parents in the educational process and promoting greater interaction between parents and schools, which affects the overall atmosphere in the educational institution and support for students.

The use of ICTs by future teachers in the educational process of higher education institutions was studied by V. Rebenok & O. Torubara (2023). They found that the use of ICT in teaching helps to increase the effectiveness of learning, saves time on the preparation of materials and allows for better interaction with participants in the learning process. However, there is also a certain level of resistance from teachers who are not sufficiently prepared to use technology. Scientist A. Klimenko (2020) analysed the feasibility of introducing electronic diaries and journals into the educational process. The author explored the advantages and disadvantages of such technologies in the context of schools and higher education institutions. At the same time, the author emphasised the importance of digital tools for improving control over student and pupil performance. The impact of ICT on sustainable education was considered by W. Al-Rahmi *et al.* (2020). The authors explored how digital communications help to create sustainable learning environments where information is available to every participant in the process and also considered the potential of ICTs for the development of global education, especially in developing countries. S. Zhang *et al.* (2022) studied the environmental impact of ICTs, in particular their role in

the development of education in developing countries. The authors focused on how ICTs can contribute to sustainable development by reducing emissions and optimising resource use in educational institutions.

In summary, the studies demonstrate the significant potential of ICTs in modernising the educational process, developing communications and sustainability, but also emphasise the need to overcome technical, methodological and social challenges to maximise the use of these technologies.

The purpose of the study was to highlight the use of ICT in the organisation of the educational process on the example of the development and implementation of electronic journals. The main objectives of the study included identifying the advantages and disadvantages of using electronic journals, assessing the effectiveness of automation of the educational process and the prospects for integrating such systems into the broader context of digitalisation of education, creating a plan for the full implementation of the system in the second semester.

MATERIALS AND METHODS

The study was conducted at the Myrhorod Mykola Hohol Vocational College of National University "Yuri Kondratyuk Poltava Polytechnic" during the first semester of the academic year 2024-2025. The testing of the HappyCollege. Online system was aimed at evaluating its effectiveness and identifying possible problems before full implementation in the second semester. A theoretical analysis was conducted for the following systems: E-Journal.UA, Single School and MySchool. The functionalities of these platforms, their impact on the automation of routine tasks, increasing the transparency of the educational process and improving communication between students were considered. The theoretical basis of the study is modern approaches to the use of ICT in education, in particular in the management of the educational process. To study the topic, we used methods of scientific cognition, including analysis, comparison, and systematisation of theoretical sources, as well as empirical methods such as observation, testing, and questionnaires.

During testing, teachers kept records in both traditional paper journals and an electronic system. The system automatically collected data on students' attendance, grades and performance, which significantly reduced the time required to enter and process this information compared to traditional methods. This also made it possible to monitor the dynamics of student performance, reducing the risk of errors in the data entered. Regular monitoring of user performance was carried out through surveys and questionnaires, where teachers could express their opinions on the system. This feedback became the basis for correcting the identified problems and improving the user experience. It is worth noting that the surveys and questionnaires were conducted in compliance with ethical standards, including the voluntary participation of respondents, anonymity, and confidentiality of the data obtained. Participants were informed about the purpose of the study and had the right to refuse to participate or skip any question. The questions

were formulated neutrally so as not to influence the answers, guaranteeing the objectivity and impartiality of the results. The evaluation of HappyCollege. Online's effectiveness also included a study of the system's impact on student performance, which made it possible to determine the advantages of the electronic system in terms of data processing and overall facilitation of the work of teachers. An important aspect was also ensuring the platform's technical compatibility with various devices and compliance with cybersecurity standards, which confirms its ability to store and protect users' personal data.

During the test, teachers kept records in both traditional paper journals and the electronic system at the same time. The system automatically collected data on attendance, grades, and student performance. This also made it possible to quickly track the dynamics of student performance, reducing the risk of errors in the data entered. A statistical analysis of the collected data was carried out, which made it possible to compare the effectiveness of paper and electronic journals in terms of various indicators, such as the accuracy of the data entered, the time spent on entering information, and the ease of use of the system.

RESULTS

The use of electronic journals in educational institutions of Ukraine

In Ukraine, the introduction of electronic journals is becoming one of the key areas of the digitalisation of education. Such systems help to solve urgent problems of educational process management, increase transparency of educational activities, facilitate administrative work and ensure interactivity in the interaction between teachers, students, parents, and administration. Digital journals allow implementing approaches aimed at optimizing the educational process, integrating with modern technologies and ensuring a high level of accessibility of educational information. An analysis of the experience of implementing electronic journals in Ukraine reveals key aspects of their effectiveness and prospects for further development.

Ukrainian e-journals such as E-Journal.UA, Single School and MySchool have already proven their effectiveness in educational institutions of various levels. The E-Journal.UA platform is focused on automating the processes of recording academic performance and attendance. It allows teachers to enter data on students' grades in a convenient format, generate reports, and get quick access to statistics. Students and their parents can view their progress via mobile applications or a web portal in real time. This approach significantly reduces the time spent on routine administrative tasks and helps to increase the level of engagement of all participants in the educational process.

The national platform "Single School" integrates all key aspects of the educational process, including class scheduling, journaling, progress monitoring and extracurricular activities. In addition, the platform provides analytical tools for generating reports based on learning data, allowing school administrators to make quick decisions. The system

also supports interactive communication between teachers, students and parents, which creates an effective environment for monitoring and supporting educational processes. The system gained particular popularity during the COVID-19 pandemic, when distance learning required schools to have modern digital solutions. MySchool offers a modular approach to managing the educational process. It allows educational institutions to flexibly adapt the functionality to their needs, including integration with library systems, student payment modules, and even adding functions for extracurricular activities. The system is also synchronised with state standards, which makes it easier to keep track of progress in accordance with the regulatory requirements of the Ministry of Education and Science of Ukraine. An important aspect of MySchool is the availability of teaching materials and assessments in digital format, which allows teachers and students to interact regardless of location.

An important component of the successful implementation of electronic journals is staff training. For many teachers, especially older ones, adapting to digital tools can be a challenge. However, providing training and instructions on how to use the platforms helps to ensure the successful adoption of new technologies. In this respect, systems such as the One School and MySchool provide user-friendly and intuitive interfaces that simplify the integration process for new users. In general, the introduction of electronic journals in Ukraine creates numerous benefits for all participants in the educational process. The main results include the automation of routine administrative tasks, increased transparency of data on student performance and attendance, reduced administrative burden on teachers and administrators, and improved communication between teachers, students, and parents. These systems form the basis for further digitalisation of education and the integration of analytical technologies such as artificial intelligence to personalise the learning process and predict student performance.

In the future, Ukrainian e-journals can be improved by integrating with distance learning platforms such as Moodle, expanding mobile functionality for better access to data, and introducing tools for analysing large amounts of educational data. It is also important to ensure equal access to these technologies for all educational institutions, including schools in rural and remote areas where there may be limited infrastructure or low levels of technical training. Thus, e-journals in Ukraine are becoming an important step towards the modernisation of education, providing tools for effective management of the learning process, integration of modern technologies and creation of a favourable environment for learning and development.

Description of the HappyCollege.

Online system (main system functions)

The HappyCollege.Online system is a digital platform for automating and organising the educational process in professional higher education institutions. One of the main functions of the system is to create and manage class

schedules. This function allows the administration of an educational institution to customise the timetable for different groups of students and courses. Using the system, the administration is able to take into account all the features of the course: the number of teachers, the availability of teaching materials, and the ability to make changes quickly in case of unforeseen circumstances (for example, replacing a teacher, postponing or cancelling classes). Thanks to this flexibility, the system helps to avoid duplication of classes, reduces the likelihood of confusion in the schedule and allows making the most efficient use of the institution's resources, including premises, equipment and teaching staff.

The HappyCollege.Online system supports the maintenance of personal profiles for each student, where all the necessary data is stored, ranging from personal information (last name, first name, patronymic, contact details, date of birth) to academic performance, attendance history and other important aspects. This function not only improves the organisation of student records but also reduces the likelihood of human errors associated with paper records. Teachers and administrators can easily make changes to this data, which guarantees the relevance and accuracy of the information. For example, if a student changes groups, adds a new grade, or changes contact details, all changes can be made in real time and are automatically synchronised across all sections of the platform, including timetables and reporting. Centralised access to student profiles provides the ability to monitor and verify data for different categories of users: administration, teachers, students, and their parents. This approach reduces the administrative burden on the staff of the educational institution and improves interaction between all participants in the educational process.

The system allows teachers not only to enter grades for various forms of control (quizzes, labs, tests, exams), but also to keep track of student attendance. All data is automatically updated and displayed in real time in students' personal profiles. This allows students to have constant access to information about their progress, which encourages them to adjust their learning activities if necessary. Grades can be entered for different types of activities and outcomes, and can automatically take into account different levels of course difficulty, which ensures accurate assessment of student progress. Another important feature is the attendance management function, which allows teachers to monitor student attendance. The HappyCollege.Online system has a mobile version that allows one to access one's information (grades, schedules, notifications, reports) anytime and from anywhere. It also allows teachers to make changes or adjustments quickly without being in the classroom. For example, they can enter grades or notifications of schedule changes, which provides convenience for all parties involved.

Teachers and administrators can use the system to combine students from different areas of study into general education courses, which allows them to organise learning more efficiently and reduce duplication of classes. This function significantly reduces the administrative burden on the staff of the educational institution, as groups are formed

automatically based on certain criteria (timetable, availability of teachers, common interests). Grouping allows for optimising the use of educational resources (classrooms, equipment, teaching materials) and improving interaction between students and teachers, as students from different fields can share their experience and knowledge within the framework of common topics.

The system automatically calculates students' grade point averages, taking into account all the grades entered for various activities (quizzes, tests, labs, exams). Since all data is stored electronically, this process takes a minimum of time and eliminates human errors that can occur during manual calculation. It is worth noting that the system generates reports on student performance, which can be used for internal monitoring or sent to students and their parents. The reports can be adapted for different purposes, allowing not only to assess students' academic performance but also to monitor their progress in specific aspects of their academic activities. The implementation of HappyCollege.Online is a significant step forward for educational institutions seeking to optimise administrative processes and improve accessibility and transparency of education for students, teachers, and parents. The automation of routine tasks, prompt access to up-to-date information, and increased efficiency of the educational process make this system an

indispensable tool for modern educational institutions.

System testing at Myrhorod Vocational College

Myrhorod Vocational College tested the HappyCollege.Online system during the first semester of the 2024-2025 academic year to evaluate its effectiveness and identify possible problems before full implementation in the second semester. During the test, teachers simultaneously used both traditional paper journals and the new electronic system to keep track of students.

Table 1 shows a comparison of several key criteria of how teachers worked with paper and electronic journals during the HappyCollege.Online testing. These indicators were determined based on observations of the work of teachers and students during the first semester, taking into account the number of grades entered, attendance and reports, as well as user feedback. The comparison shows the advantages of electronic journals in terms of time and accuracy and also makes it possible to understand how much the administrative burden is reduced when using automated systems.

Electronic journals, such as HappyCollege.Online, significantly reduce the time required to perform basic accounting tasks in educational institutions, making the whole process more efficient, convenient and resource-saving (Table 2).

Table 1. Comparison of working with paper and electronic journals

Criterion	Paper journal	Electronic journal
Data entry time	More time (10 to 15 minutes per student)	Faster (automatic calculation and filling)
Data accuracy	Possibility of errors due to manual input	Higher accuracy through automation
Ease of use	More complicated, requires physical access to the log	Easy access via any device
Monitoring progress	It is required to manually calculate grade point averages and track attendance	Automatic updates, access to real-time data
Resource costs	Required costs for paper, pens, document storage	Minimum costs (electronic form)
Data accessibility for students and parents	Limited access, only after requesting from the teacher	24/7 access via the platform for all participants in the learning process
Administrative burden	High, requires additional time to process and store information	Low, thanks to automatic data processing

Source: compiled by the author

Table 2. Time to complete basic tasks

Task	Paper journals	Electronic journals (HappyCollege.Online)
Entering grades for the semester	3 hours per teacher	1 hour per teacher
Generating progress reports	1 hour per group	20 minutes per group
Attendance check	7 minutes per group	5 minutes per group

Source: compiled by the author

Full implementation plan in the second semester

In the second semester, the full implementation of HappyCollege.Online is planned, which involves a comprehensive assessment and correction of test results and improvement of the platform. The results will be evaluated based on comments from teachers and administration, which will allow us to identify problems in a timely manner and make the necessary changes to the interface. This may include improv-

ing the intuitiveness of the system and adding new features to enhance its usability. Based on the feedback received, the issue of additional training for teachers will be decided to ensure their maximum efficiency in using the system.

An important step will be the full transition to electronic journals for keeping records and assessing student performance. This will mean that all teachers will use the platform to exercise full control over the learning process:

from tests and quizzes to laboratory work and other activities. Automation of all these processes will significantly reduce the time teachers spend on data entry and reduce the likelihood of errors. It is also worth noting that this will provide more transparent access to information for students and parents, which will help to better control the learning process.

Another important step is to increase technical support for the system. Increasing the number of IT specialists to deal with timely technical failures is necessary to ensure the stability of the platform, which is especially important in the context of a large-scale implementation. Support will also need to be provided to ensure that students can use the platform seamlessly from any device, whether it is a computer or mobile phone, allowing them to access their grades, timetables, and learning materials anytime and anywhere. The expansion of mobile access is another step in the system's improvement plan. Integration of the platform with other educational systems, such as library or student payment systems, will create a unified educational ecosystem that will significantly improve the user experience. Students will be able to easily access all the necessary educational resources and services through one platform, which is more convenient and faster than using several services.

Last but not least, the system will be continuously monitored and feedback from all users – students, teachers, and administration – will be collected on a regular basis. This will ensure timely response to any problems or needs, process adjustments and system improvements. Only through active user involvement can we ensure a high level of satisfaction and efficiency from the implementation of the platform. Testing of HappyCollege.Online at Myrhorod Vocational College revealed the platform's capabilities to improve the management of the learning process and optimise the work of teachers. After correcting the comments and improving technical support, the system will be fully implemented in the second semester, which will optimise student performance and attendance, reduce administrative burden and increase transparency of the educational process. The HappyCollege.Online system solves several key problems faced by teachers and administrators of educational institutions in the process of managing the educational process. One of the main challenges is to simplify the work of teachers. Previously, they spent a significant amount of time maintaining paper journals, entering grades, recording attendance and generating reports. The system automates these processes, which significantly reduces the time required to perform routine tasks and allows teachers to focus more on the learning process and interaction with students.

The use of mobile devices is another challenge that the system addresses. It is fully adapted to work on mobile phones and tablets, allowing teachers to access journals, assessments, and other learning materials anytime and from anywhere. This makes the system accessible to all participants in the learning process, no matter where they are. Optimisation of work with combined groups is another

important advantage. Previously, teachers had to keep separate records for each group, which led to duplication of work, especially for general education subjects taught by several groups. The system automatically combines these groups for joint journaling, which allows for effective resource planning, reduces administrative burden and provides convenience for teachers. Automation of grade calculation and report generation greatly facilitates the work of teachers and administrators. The system independently calculates students' average grades based on the entered grades and generates progress reports. This not only reduces the number of errors, but also allows quickly getting all the necessary information, which is essential for monitoring and planning the educational process.

One of the main prospects for the development of the system is the development of additional modules for reporting and log archives, which will create a centralised system for storing all logs and reports for previous years, which will simplify access to historical data and provide better control over long-term learning outcomes. It will also help to store all information electronically, which will reduce the need for physical archiving of documents. Another prospect is to provide students with access to their grades through the system in real time, which will help to increase their motivation and responsibility for their performance. Parents will be able to check their children's progress at any time, which will also increase the transparency and effectiveness of interaction between students, their parents, and teachers.

ICTs play a key role in optimising the learning process, particularly in higher education institutions. The use of ICTs allows for the integration of various digital platforms for managing the learning process, which significantly improves efficiency and convenience for both teachers and students. The integration of digital tools for scheduling, record-keeping, assessment and progress monitoring allows for the automation of many routine tasks, such as entering grades, calculating grade point averages and generating reports. This reduces the workload of teachers and administrators and allows them to focus on more important aspects of the learning process, such as interacting with students, developing teaching materials and delivering lectures.

Increased accessibility of learning resources is another important benefit of ICT. Students can access electronic materials, video lectures, tests, and assignments from anywhere and at any time. This allows them to organise their learning more flexibly and efficiently and ensures equal opportunities for all students regardless of their location. Mobile technologies also contribute significantly to optimising the learning process. Using mobile applications to access learning materials, grades, schedules, and other system functions makes learning more accessible. Students can get important information on the go, which contributes to a more efficient use of time and better organisation of the learning process. In general, ICTs help to improve communication, reduce administrative burdens and increase the availability of learning resources, making the learning

process more efficient and adapted to the needs of modern students and teachers.

DISCUSSION

The findings of the study on the introduction of electronic journals in professional higher education institutions provide important conclusions on improving the efficiency of learning management, reducing administrative burden, increasing transparency of learning activities and improving access to learning materials. The importance of these results lies in the fact that they confirm the effectiveness of using ICTs to optimise routine administrative processes, such as grading, attendance and reporting, which in turn allows for more time to focus on teaching students.

Information technology in education has become a powerful tool for transforming learning processes, as indicated by D. Hawkrige (2022). The study showed that electronic platforms greatly simplify the management of the learning process, reducing time spent on routine tasks and improving the availability of information for students and teachers. This is in line with the results of the study, which showed how automation of routine tasks, such as entering grades and attendance, improves the efficiency of administrative work and reduces the workload of teachers. O. Khmarna (2023) emphasises the importance of introducing ICT into the learning process and managing learning processes, increasing the efficiency of educational services. J. Silva *et al.* (2024) investigate the factors that influence students' use of ICT for educational purposes. The study showed that students find it much more convenient to work with electronic journals, which allows them to quickly receive up-to-date data on their grades and attendance. This coincides with the results of testing the HappyCollege.Online system, where students noted the convenience and accessibility of information.

The use of ICTs in the training of psychological counsellors, emphasising the importance of integrating digital technologies to improve learning processes in specialised disciplines, was studied by Ş.G. Zeren (2024). The study noted that the introduction of ICT in educational systems significantly improves the effectiveness and accessibility of learning materials for students. This study also recorded an increase in the availability of learning resources and the convenience of their use, which correlates with the scientist's results on the positive impact of ICT on learning.

T. Quraishi *et al.* (2024) studied the improvement of educational systems through ICT, which can significantly increase the efficiency of learning processes. The study confirmed that electronic journals automate routine processes, improving access to information and reducing the burden on administration. This is consistent with the author's conclusions about the positive impact of ICTs on improving the efficiency of educational processes. V. Spivachuk & M. Ikonnikova (2022) note that modern ICTs are being actively implemented in the educational processes of higher education institutions, providing interactivity and automation of routine tasks. This study, as well as the work of other

researchers, points to the importance of automating the entry of grades and reporting, which increases the efficiency of teachers and administrators. The impact of the classroom environment, teacher competence, and ICT resources on student engagement and academic achievement was studied by J. Hanaysha *et al.* (2023). The results of the study showed that e-platforms such as HappyCollege.Online simplify the monitoring of student performance and contribute to increasing the level of student engagement in learning due to the availability and efficiency of information. The issue of the need to introduce ICT in education, emphasising its importance for the modernisation of educational processes, was studied by E. Hrytsenko (2023). This study also focuses on the need to integrate digital technologies to ensure the effectiveness of the learning process, which confirms the importance of ICT mentioned in the researcher's work.

The impact of ICT development and educational changes on sustainable environmental development in economic blocs such as BRICS, MINT and G7 was analysed by B.A. Gyamfi *et al.* (2023). This is consistent with the study's findings that ICTs can help reduce environmental impact, including by reducing the use of paper materials. The study notes that e-journals reduce the use of paper and reduce the environmental impact, which coincides with the researcher's findings on the environmental benefits of ICT in education. S. Mirsharapovna *et al.* (2022) examined the advantages and disadvantages of using computer technology in education, emphasising that it can improve learning efficiency but also has risks associated with technical problems. The study found that, despite technical failures, the overall system significantly improves the process of entering grades and attendance, which is consistent with the results of this study. Z. Shatri (2020) discusses both the advantages and disadvantages of using ICT in education, noting the reduction in student stress due to the availability of real-time. The results of the HappyCollege.Online test support the idea that stress is reduced through access to up-to-date information, although some technical difficulties have also been identified that need to be addressed. but also noting potential difficulties due to technological barriers. The results of the HappyCollege.Online test support the idea that stress is reduced through access to up-to-date information, although some technical difficulties have also been identified that need to be addressed.

The benefits of mobile technologies for learning, noting that they provide access to materials anytime and from anywhere, were studied by S. Criollo-C *et al.* (2021). In the study, a mobile version of the platform was implemented, allowing students and teachers to access learning materials, grades, and schedules at any time, which is in line with the scientist's conclusions about the benefits of mobile learning. S.O. Zamko (2021) considers the benefits of using electronic diaries and journals in education, in particular in the context of computer science lessons, where electronic journals provide more effective control over student performance. The results of the study confirm that electronic journals greatly simplify the process of entering grades

and reports, which reduces the burden on teachers and administrators, meeting the needs of modern education. K. Ratheeswari (2018) emphasises the importance of ICT in education to optimise learning processes. In the study, automation of data entry and report generation improves the efficiency of teachers, which is in line with K. Ratheeswari's findings on optimising learning through ICT.

The integration of electronic resources in the library environment of higher education institutions, in particular the benefits and challenges associated with the introduction of ICT, is studied by I. Bondar (2023). The study findings indicate that the integration of electronic systems greatly facilitates access to learning materials, reducing the burden on the administration and ensuring more efficient work organisation. This coincides with the scientist's results on improving access to information through electronic resources. S. Desai (2010) emphasises the importance of ICT in education to improve learning and teaching processes, which is supported by the results obtained, as the HappyCollege. Online platform automates routine tasks such as entering grades and attendance, allowing students to focus on more important aspects of the learning process. J. Anderson *et al.* (2002) examined the role of ICT in schools and development programs for teachers. The study focused on teacher training for effective use of the e-journal platform. This correlates with the scientist's ideas about the need to prepare teachers to use new technologies in the educational process.

The introduction of ICTs in education and the importance of their implementation for effective learning is considered by D. Moursund (2005). This study notes that the introduction of electronic journals automates many administrative processes, which makes the work of teachers and administrators easier, responding to the needs voiced in the work of D. Moursund. Automation of grades and attendance are key aspects that increase the efficiency of learning, which coincides with the scientist's ideas on creating systems to optimise the educational process. In summary, the study confirms the importance and effectiveness of ICT, in particular electronic journals, in managing the learning process, which reduces administrative burden and increases the availability and transparency of information. However, to achieve the maximum effect, it is important to take into account technical and social aspects, as well as to continue working on improving the functionality of such systems.

CONCLUSIONS

The results of the study show that the introduction of electronic journals, in particular the HappyCollege.Online system, is a key tool for improving the efficiency of managing the learning process in higher education institutions. The system has significantly reduced the time spent on routine tasks: entering grades has been reduced from 3 hours per teacher to 1 hour, and generating progress reports has been reduced from 1 hour to 20 minutes per group. The time required to check attendance has also been reduced from 7 minutes to 5 minutes. This demonstrates the high performance of the system and its ability to optimise the daily work of teachers and administration.

Electronic journals have helped to increase the transparency of interaction between all participants in the educational process. Teachers noted the ease of automating grades and generating reports, while the administration emphasised the convenience of monitoring academic performance and attendance. The level of user satisfaction, according to the surveys, was high (5/5), which indicates a positive perception of new technologies. The results of the study showed that the introduction of electronic journals significantly increases the efficiency of administrative work in educational institutions, in particular through the automation of entering grades, attendance and generating reports. The use of such systems reduces the time required to perform routine tasks, improves data accuracy and reduces the likelihood of errors associated with manual input. Electronic systems have also been found to improve communication between all stakeholders in the educational process and increase the transparency and openness of the educational process. Further research could focus on the development of intelligent modules for predicting student performance and automating curriculum assessment. It is also important to study their impact on the motivation of participants in the process and the formation of a digital culture that will help improve the quality of educational services.

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CONFLICT OF INTEREST

None.

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Розробка та впровадження електронних журналів у фахових передвищих закладах освіти

Анотація. Актуальність дослідження обумовлена необхідністю підвищення ефективності освітніх процесів через застосування сучасних інформаційно-комунікаційних технологій (ІКТ). Метою дослідження було представити ІКТ в управлінні навчальним процесом через досвід розробки та впровадження електронних журналів. Дослідження проводилося з використанням змішаної методології, яка включала аналіз існуючих систем управління навчальними процесами, опитування користувачів (викладачів, студентів, батьків), тестування прототипу розробленої системи, а також статистичну обробку зібраних даних для оцінки її ефективності. Впровадження платформи автоматизує рутинні завдання, такі як введення оцінок і формування звітів, зменшуючи витрати часу й ресурсів. Порівняння електронних журналів і традиційних паперових показало, що електронні системи значно скорочують час на виконання адміністративних завдань: введення оцінок та формування звітів займає набагато менше часу при використанні інтерактивно-комунікаційних технологій, що знижує адміністративне навантаження та дає можливість більше зосереджуватись на навчальному процесі. Результати дослідження показали високу задоволеність користувачів: викладачі, адміністрація, студенти та батьки відзначили зручність інтерфейсу та доступність інформації в реальному часі, що сприяє ефективному моніторингу успішності, відвідуваності та створенню звітів. Отримані результати можуть бути використані в фахових передвищих навчальних закладах для автоматизації обліку оцінок, відвідуваності та забезпечення доступу студентів до навчальних матеріалів, що підвищить ефективність управління навчальним процесом, а також створюють підґрунтя для майбутнього розвитку систем електронного управління навчальним процесом, що може стати важливим кроком у цифровізації освіти в цілому

Ключові слова: інформаційно-комунікаційні технології; коледж; диджиталізація; автоматизація навчального процесу; моніторинг навчання

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Abstract. The aim was to identify recommendations for future specialists in the field of psychology on the use of modern human resources (HR) platforms. The functionality of modern online platforms used in HR management is analysed. The study of the experience of leading companies, a survey of students and teachers, and a comparative analysis of HR platforms in three countries, namely Ukraine, the USA, and Germany, were described. The main results of the study demonstrated that the introduction of automated HR platforms into the educational process contributes to a significant improvement in the practical skills of bachelors of psychology. Students have acquired not only basic knowledge but also experience with modern HR systems such as SAP SuccessFactors, Workday and BambooHR, which has enabled them to better prepare for their future professional activities. The analysis of the results showed that the use of such platforms helped students to master key competencies in performance evaluation and transparent communication in the team. The introduction of HR platforms has had a positive impact on students' awareness of modern HR management tools, increased their adaptability to the latest technologies and readiness to work in remote and international environments. The integration of such platforms into the curriculum helped students to be prepared for the real challenges of the modern labour market, where HR technologies play a key role. Students who learn how to work with these platforms gain a competitive advantage, as many companies are looking for professionals who can effectively use digital technologies. Particular attention should be paid to improving data security, which is becoming critical when working with HR platforms, as employees' personal data needs to be protected from unauthorized access. This study can be used by teachers of higher education institutions and HR managers to introduce modern HR platforms into the educational process and training of future psychology professionals

Keywords: management; digital tools; process automation; innovative approaches; software solutions; online platforms

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INTRODUCTION

Modern labour market is characterised by dynamic changes that require human resource professionals to be flexible and adaptable. In this context, online human resources

(HR) platforms are becoming important tools that not only optimise management processes but also improve communication within organisations. Thanks to such technologies,



businesses are able to effectively attract, develop and retain talent. This increases the overall productivity and competitiveness of companies on the global stage. In the context of globalisation and technological progress, it is important that universities and educational institutions that train specialists in this field take into account current trends and integrate the latest technologies into the educational process. Students studying HR-related professions should acquire knowledge and skills that meet the requirements of the modern market. It is important that their training includes practical experience with HR platforms, as this allows students to acquire the necessary competencies for a successful career.

Many modern scholars study this topic and offer different views on it. For example, D. Schultz & S. Schultz (2020) analysed the impact of psychology on work processes, focusing on productivity. They found that effective psychological methods can improve team atmosphere and overall productivity. Modern trends in criminal psychology were considered in the work of R. Morgan & M. Olver (2023), which emphasised the importance of training specialists through modern curricula. A systematic approach to training can significantly improve the quality of practice in this area, which makes the study particularly relevant. A study conducted by F. Oswald *et al.* (2020) defined the role of big data in industrial and organisational psychology. They argued that the integration of analytics can significantly improve organisational research and HR practices, providing new opportunities to optimise HR processes. The study by I. Pappageorgi *et al.* (2024) highlighted students' perspectives on their professional training, focusing on the skills acquired by psychology bachelor's degree graduates in Europe. The results of this study can serve as a basis for improving university curricula. The article by W. Robiner *et al.* (2020) focused on the differences in the training of psychologists between different professions. The authors emphasised the need to improve professional standards in psychology, which is critical to ensuring the quality of training. The relevance of training psychologists in the context of the COVID-19 pandemic was pointed out in the study by S. Shojaei & R. Masoumi (2020). They demonstrated how changes in the work environment have affected the training and practice of psychologists, noting that new challenges require the adaptation of curricula. The study of the professional identity of future psychologists in the context of their professionalisation was conducted in the work by N. Starynska *et al.* (2023). The study emphasised the importance of developing a professional identity to achieve a successful career in psychology.

K. Stavroulia *et al.* (2019) assessed the emotional impact of virtual reality on teacher education. They showed how new technologies can improve the quality of education in psychology, which demonstrates the potential of virtual learning. The integration of psychological literacy into psychology curricula was considered by N. Tick *et al.* (2024). The authors analysed the experience of teachers and the opinions of students, which can improve the structure of training and ensure more effective training of

future professionals. The importance of training professionals to work with trauma was emphasised in the study by S. Wang *et al.* (2022). The authors investigated psychologists' perceptions of client assessment and treatment, which helps to understand the training needs in this area. M. Veiga *et al.* (2024) examined the training of school psychologists in conducting culturally appropriate behavioural assessment interviews. The study highlighted the importance of cultural competence in the practice of school psychologists, which can significantly affect the effectiveness of their work. The analysis of the readiness of future educational psychologists for managerial innovations in universities is presented by K. Zhumabekova *et al.* (2022). The study can become the basis for improving the training of specialists in the field of psychology, in particular in the context of innovation management.

The studies analysed various aspects of psychology training, including the impact of psychological methods on labour productivity, the importance of modern curricula, the role of big data in industrial and organisational psychology, and the development of students' professional identity. However, a number of gaps have been identified that require further study. In particular, the specifics of the use of psychological methods in the educational process are not considered, which complicates their integration into educational programmes. There are no recommendations for eliminating discrepancies in the training of psychologists and no analysis of the long-term consequences of adapting curricula to new challenges. In addition, an interdisciplinary approach to training professionals to work with trauma and practical examples of implementing managerial innovations in education require attention. The aim of the study was to investigate the use of modern online platforms to assess the effectiveness and study innovative approaches in HR management. Research objectives were:

1. Analysing the functionality of modern online platforms used in HR management.
2. Developing recommendations for optimising the use of online platforms in HR management processes.

MATERIALS AND METHODS

The study of bachelors' practical skills in using HR platforms is based on a mixed approach. The main research methods included a comparative analysis of existing HR platforms and a survey of bachelor's students and professors of Ukrainian higher education institutions. The research was conducted in three stages. The first stage was to study the experience of leading companies from countries such as Ukraine, the US, and Germany to identify key criteria for the effectiveness of HR platforms. The cases of well-known corporations were analysed, including BetterHelp, Headspace, Haufe Group, and the Ukrainian Institute of Cognitive Behavioural Therapy. These companies were selected due to their widespread use of HR technologies to automate HR management and strategic development. At this stage, authors managed to identify the functions of HR platforms that are most effective in the current environment, including

integration with other systems, data security, adaptability to local requirements and remote work. This analysis provides the basis for the formation of criteria for assessing the practical skills of bachelor students in the use of HR platforms.

The second stage of the study included the collection of empirical data through an anonymous survey among undergraduate students studying psychology-related subjects. The practical part of the study included a survey of 300 undergraduate students, 100 from each of the following Ukrainian universities: Ukrainian Catholic University, Taras Shevchenko National University of Kyiv and National University of Ostroh Academy. The sample consisted of 200 women and 100 men aged 19-22. The students were studying psychology-related majors. The survey was conducted online for a month using Google Forms and SurveyMonkey, which allowed for quick data collection and processing. The questionnaires included questions about the level of familiarity with HR platforms such as SAP SuccessFactors, Workday, BambooHR, experience of using them during practical classes or internships, as well as an assessment of the level of students' preparation to work with these platforms in future jobs. The questionnaire included questions about the level of practical skills in working with HR platforms, experience of using them during practical classes or internships, and the level of preparation for using these platforms in future jobs. The survey was conducted over two weeks, from 1 to 14 September 2023. After the first stage, the results were collected and analysed, and a second survey to check the dynamics of changes in the level of students' knowledge and skills was conducted three months later, from 1 to 14 December 2023.

The second survey was conducted after the introduction of HR platforms in the educational process to assess their impact on the quality of student training. From the time of the first survey until December 2023, students had the opportunity to work with HR platforms such as SAP SuccessFactors, Workday and BambooHR during practical classes. In addition, all survey participants were informed about how the information they provided would be used, and the survey was conducted in compliance with all ethical standards set out in the Declaration of Helsinki (2013). Based on this, a cross-sectional analysis was conducted before and after the introduction of automated HR platforms.

The third stage was a comparative analysis of HR platforms in three countries – Ukraine, the United States and Germany. Specific criteria were used to evaluate the effectiveness of their use, including functionality, integration with other systems, data security, adaptability to local conditions, cost, user experience and support. The comparative analysis resulted in recommendations for Ukraine to improve the use of HR platforms.

RESULTS

Analysis of the functional capabilities of modern online platforms used in HR management

Bachelor's degree programs in psychology are changing significantly in the modern environment under the

influence of digitalisation and the development of automated HR platforms, which are becoming an integral part of the professional activities of HR professionals. The training of students at the bachelor's level is no longer limited to the study of theoretical aspects of psychology but increasingly includes the practical skills necessary to work with the latest HR technologies. This training is closely linked to automated HR platforms, which are key tools for tasks such as recruitment, talent management, onboarding, training and employee development. During the course of their studies, students are introduced to the main functions and capabilities of HR platforms, which allows them to integrate their knowledge of psychology into real-life HR work. By studying these platforms, bachelors of psychology are able to apply employee assessment and development methods in practice, using automated systems to collect, process and analyse data. This not only simplifies routine tasks, but also allows focusing on the strategic goals of human resource management. Such training is of great importance for students' future careers, as modern employers increasingly expect HR professionals not only to be able to work with people, but also to know the technologies that simplify these processes. Skills in working with automated HR platforms help psychology students to be more effective in analysing HR data, planning employee development, and ensuring quality interaction between employees and the organisation. Mastering such technologies significantly increases their chances of success in the professional environment and makes them competitive in the labour market. Practical skills in working with automated HR platforms are an important part of the Bachelor of Psychology program. This combination of a theoretical basis in psychology and the use of the latest technologies in HR management allows students to be prepared for the challenges of modern professional activity and successfully integrate into the labour market.

In modern business environment, students studying human resource management should understand why HR platforms are needed, what they are, their main functional blocks, and the benefits that companies get from their implementation. HR platforms are designed to automate and optimise human resource management processes in an organisation. They help in collecting and storing employee data, managing recruitment by facilitating the selection of candidates, monitoring employee performance, career planning and skills development, as well as processing payroll and maintaining employment records. HR platforms can vary depending on the functionality, purpose, and size of the company. The main types of HR platforms include recruitment management systems such as Greenhouse or Lever, human resource management systems (HRMS) such as SAP SuccessFactors and BambooHR, and learning and development platforms such as TalentLMS or Cornerstone OnDemand. The main functional blocks of HR platforms typically include modules for recruitment management, HR management, learning management, performance evaluation and payroll management. These modules allow HR

departments to perform their tasks efficiently, improving employee engagement and increasing process efficiency.

In Ukraine, popular platforms such as WebHR, HR-Cloud, SmartHR and Zalishka offer different functionalities to meet the needs of the local market. The difference between them may lie in specialisation, user-friendliness, pricing and technical support. Companies that implement HR platforms receive numerous benefits, despite the cost of implementation. These include time and resource savings, as the automation of routine processes allows HR departments to focus on strategic tasks. The quality of recruitment and talent management improves, which can lead to lower staff turnover and increased productivity. Thanks to data analytics, companies can make more informed decisions based on actual performance indicators. Graduates joining the company should be able to work with the

chosen platform and be ready to implement or customise it if necessary. Practical skills in working with HR platforms are becoming an important factor in the success of young HR professionals, as they allow them to effectively integrate new technologies into the company's management processes.

Table 1 demonstrates not only the functions of HR platforms, but also their specific features in the context of each company. This is important for understanding how certain technologies are used in the practice of HR professionals. For example, BetterHelp focuses on maintaining psychological health through online therapy, which provides remote assistance to employees. Headspace focuses on stress reduction and meditation tools that contribute to the overall well-being of employees. The Ukrainian Institute of Cognitive Behavioural Therapy uses an HR platform to automate HR management and mental health support programmes.

Table 1. Analysis of types, key functions and features of HR platforms

Country	Company	Key features of HR platforms	Platform features
Ukraine	Ukrainian Institute of Cognitive Behavioural Therapy	Automation of personnel management, integration with other systems, adaptability to local requirements	Centralised management of regional branches, automation of recruitment, training, and performance evaluation
	BetterHelp	Data security, remote work support, strategic development through HR technologies	Innovative solutions for data analytics, algorithm-based recruitment, artificial intelligence integration
USA	Headspace	Integration with systems, talent management, adaptability to local requirements	Learning and development platforms, performance monitoring tools
Germany	Haufe Group	Integration with other systems, adaptability to local requirements, strategic management of personnel development	Using HR systems for global employee coordination, supporting multilingual platforms, strategic development

Source: created by the authors

One of the most important aspects of the table is to demonstrate the adaptability of HR platforms to local requirements. Different countries may have different legislative, cultural and organisational challenges, and HR platforms need to be able to adapt to these conditions. This is particularly evident in the case of the Haufe Group, which uses multilingual platforms to ensure interaction between employees from different countries. This allows the company to remain competitive in the international market without compromising on the efficiency of HR management. The presentation outlines the functions of HR platforms that are essential for modern organisations and how they can be used in different economic environments. It also emphasises the need for a strategic approach to the selection and implementation of HR platforms.

The implementation of HR platforms in leading companies in Ukraine and abroad has demonstrated significant effectiveness in optimising HR processes, improving talent management and increasing productivity. One of the main benefits is the automation of HR processes. Leading companies such as Coca-Cola and Nestlé are actively using HR platforms to automate routine tasks such as processing leave requests, timekeeping, and payroll management (Balasundaram & Venkatagiri, 2020; Barno *et al.*, 2020). This

allows HR departments to focus on strategic tasks, such as talent development and change management in the organisation. The introduction of HR platforms significantly improves the recruitment process. For example, Luxoft in Ukraine uses the Greenhouse platform to optimise recruitment processes. Thanks to this platform, the company can easily track candidates, automate interview invitations, and receive analytical data on the effectiveness of recruitment campaigns, which reduces the time to hire and improves the quality of recruitment. Talent management and staff development are also becoming more efficient with HR platforms. For example, SoftServe has implemented the SAP SuccessFactors platform, which allows it to effectively manage employee development (Hong *et al.*, 2019). This platform provides opportunities for career planning, performance assessment, and training, which helps to increase employee motivation and reduce staff turnover. Data analytics provided by HR platforms are also important. Companies such as Intellias use these platforms to collect and analyse employee performance data, which allows them to make informed decisions about HR management. Thanks to analytics, management can identify team strengths and weaknesses, as well as identify training needs. The implementation of HR platforms in leading companies, both

in Ukraine and abroad, confirms their effectiveness in increasing productivity, improving talent management processes and achieving the organisation's strategic goals.

In modern HR environments, the role of HR platforms has grown significantly, helping companies automate the recruitment, management, and assessment of employees. These platforms provide a wide range of features that allow for efficient resource management, increased productivity and reduced administrative costs. In Ukraine, there are several popular HR platforms that are successfully implemented in leading companies.

Thus, HRMS are automated information systems for handling a wide range of tasks related to the management of a company's human resources. Taking HURMA HRMS as an example, it can be briefly outlined their main functionality:

1. Personnel document management (employment contracts, orders for hiring or dismissal, leave applications, sick leave certificates, etc.)

2. Adaptation of new employees (creation of individual adaptation plans, tracking of tasks performed by new employees and feedback).

3. Managing corporate culture (conducting internal surveys, collecting feedback, organising internal events, sharing news and achievements of the company, employee engagement, etc.)

4. Analytics and reporting (tools for collecting and analysing data to track key indicators (staff turnover, employee performance, recruitment costs, etc.)).

To be efficient and reduce costs, it is important to prepare HR processes for full/partial automation and rely solely on analytics without the human error factor. The analytics obtained through HRMS is objective and operational for managing efficiency and decision-making. All information about employees is stored in the system and is easily accessible. It is possible to quickly find the dates of hiring and dismissal of employees, the history of hiring, onboarding, etc.

The system has an administrator who monitors access rights, configures systems and helps employees use it. The HR automation system is compatible with financial and business systems (1C, SAP, Netsuite). For example, HRMS for recruitment collects candidate feedback from job sites, allows quickly finding the status of any candidate and viewing candidates at each stage of the recruitment funnel, sends automatic letters about CV receipt and rejection after the interview. Managers who have vacancies can log in and view their candidates. The system easily imports profiles from LinkedIn, or the candidate responds with their own LinkedIn profile, etc. As a rule, modern HRMS with a recruiting module have a set of tools that actually close a certain cycle of the hiring process. Each platform contains predefined templates (application, profile, feedback form, etc.), and at the same time, only those processes that actually exist in the company and have effective working tools can be automated. Therefore, it is advisable to create very functional recruitment tools with relevant content, which will then be transferred to the HRMS system.

Table 2. Analysis of current HR platforms in Ukraine and their main functional blocks

HR platform	Main functional blocks	Description of functions
Dates System	Recruitment management	Automation of recruitment processes, Wvacancy management, integration with job sites
	Personnel management	Storage of employee personal data, management of employment contracts
	Performance evaluation	Tools for assessing employee performance, collecting feedback
	Payroll processing	Payroll automation, benefits management
Zoho People	Recruitment management	Platform for automating recruitment, interview scheduling, and job management
	Personnel management	Modules for storing employee data, document management
	Performance evaluation	Employee performance evaluation through KPIs and 360-degree feedback
	Learning Management	Tools for planning and managing staff training
BambooHR	Personnel management	Employee record keeping, document management
	Performance evaluation	Tools for performance evaluation and feedback management
	Payroll processing	Payroll automation, benefits management
	Learning Management	A platform for organising training and skills development
Workable	Recruitment management	Recruitment tools, posting vacancies on various platforms
	Interviews	Organising and conducting interviews, recording feedback
	Reports and analytics	Generation of analytical reports to monitor recruitment campaigns
SmartRecruiters	Recruitment management	Full recruitment cycle, including job posting and candidate management
	Candidate Management	Candidate tracking, interview scheduling, and communication
	Performance evaluation	Candidate assessment through questionnaires and automated tools
	Analytics and reports	Systems for analysing the effectiveness of personnel selection and reporting
CakeHR	Personnel management	Modules for storing employee data, document management
	Performance evaluation	Assessing employee performance through feedback tools
	Payroll processing	Automation of payroll, generation of financial reports
	Learning Management	Tools for organising and monitoring employee training

Source: compiled by the authors based on Hurma (2024) and People Force (2024)

Companies cannot simply choose any available platform – they must take into account their needs, business scale and local circumstances. This is especially important for educational institutions and students studying HR technologies, as it allows them to understand what

knowledge and skills will be required for use by professionals in their future profession. Table 3 demonstrates the performance of bachelor's level psychology students in the learning process without using HR platforms, but with the use of standard PC tools.

Table 3. Results of a survey of undergraduate students at three universities before the implementation of HR platforms

Questionnaire questions	Ukrainian Catholic University	Taras Shevchenko National University of Kyiv	National University of Ostroh Academy
Level of familiarity with technologies before implementing HR platforms	Familiar – 25% Slightly familiar – 50% Not familiar – 25%	Familiar – 20% Slightly familiar – 55% Not familiar – 25%	Familiar – 15% Slightly familiar – 60% Not familiar – 25%
Did you use any technology during your practical classes or internships?	Yes, often – 15% Sometimes – 50% No – 35%	Yes, often – 10% Sometimes – 50% No – 40%	Yes, often – 20% Sometimes – 45% No – 35%
What technologies or methods were used before implementation?	Microsoft Excel – 40%, Google Sheets – 35% Others – 25%	Microsoft Excel – 45% Google Sheets – 30% Others – 25%	Microsoft Excel – 50% Google Sheets – 25% Others – 25%
Assess your level of preparation for working with these technologies	High – 15% Average – 50% Low – 35%	High – 10% Average – 55% Low – 35%	High – 10% Average – 50% Low – 40%
Do you plan to use these technologies in the future?	Yes – 60% No – 10% Not sure – 30%	Yes – 55% No – 15% Not sure – 30%	Yes – 50% No – 15% Not sure – 35%
How do you evaluate training programs before implementation?	Very useful – 30% Useful – 50% Not very useful – 20%	Very useful – 25% Useful – 50% Not very useful – 25%	Very useful – 20% Useful – 50% Not very useful – 30%
Did you have any difficulties using technology before implementing HR platforms?	Yes – 45% No – 55%	Yes – 50% No – 50%	Yes – 55%, No – 45%

Source: created by the authors

The data in the table shows the initial responses of students regarding the use of HR technologies before the introduction of specialised HR platforms. Most students were superficially familiar with such technologies. Students from the Ukrainian Catholic University have the highest percentage of working skills. The use of technology during classes and internships was limited, with Microsoft Excel and Google Sheets being the most common tools. The level of preparation for working with technology was medium or low for most respondents, and only a small proportion of students believed that technology would be useful in their future professional activities. Despite some difficulties with the use of technology, the majority of students were positive about the curriculum.

HR platforms were introduced as an important element of professional training in the process of training bachelor's level psychology students. The purpose of introducing such platforms was to familiarise students with the real tools used in the labour market for human resource management. This not only enabled students to gain practical skills but also brought them closer to their future professional activities, allowing them to understand the structure of HR processes in more detail. HR platforms such as Workday, BambooHR, and others were integrated into the educational process at several levels (Minbaeva, 2021). They were used to creating practical HR tasks. Students learnt how to

manage employee databases, process CVs, plan work, and form a team structure. The students had the opportunity to learn how to work with information that is important for their future work as HR specialists. At the initial stage, students attended lecture classes, during which they were provided with general information about HR systems. They were explained what capabilities they provide, why they are used in modern organisations, and how they can facilitate HR management processes. Students were provided with instructions and guidelines on how to use the platforms. For many students, the first experience of using such programs proved to be challenging. The main problem was that HR systems usually use corporate terminology and processes that students had not always dealt with before. In order to make learning more effective, various forms of working with platforms were introduced. In addition to lectures, students were actively involved in practical exercises where they created employee profiles in team groups and planned the distribution of responsibilities and interaction within the company. These tasks helped them develop teamwork and organisational skills.

One of the important aspects of implementing HR platforms was the work on creating reports and analysing performance indicators. Students worked with real business cases where they had to analyse productivity indicators, staff turnover, employee satisfaction and other key

factors. This allowed students to develop analytical thinking and apply their knowledge in real-life situations. Special attention was paid to the integration of platforms into the recruitment process. Students learnt tools for sorting and filtering CVs, conducting online interviews and monitoring employees' career development. They learnt how to conduct effective interviews, use automated tools to find

the best candidates, and assess their competencies using various metrics. The use of HR platforms was a challenge for many students. The main difficulties were the need to adapt to technological innovations and master digital skills that they did not have before. However, after working with HR platforms, students showed significantly better results, as shown in Table 4.

Table 4. Results of a survey of undergraduate students from three universities on the use of HR platforms

Questionnaire questions	Ukrainian Catholic University	Taras Shevchenko National University of Kyiv	National University of Ostroh Academy
Level of familiarity with HR platforms (SAP SuccessFactors, Workday, BambooHR)	Familiar – 35% Slightly familiar – 45% Not familiar – 20%	Familiar – 30% Slightly familiar – 50% Not familiar – 20%	Familiar – 25% Slightly familiar – 55% Not familiar – 20%
Have you used these platforms during your practical classes or internships?	Yes, often – 30% Sometimes – 40% No – 30%	Yes, often – 25% Sometimes – 35% No – 40%	Yes, often – 20% Sometimes – 45% No – 35%
What one platform was most useful during the practical sessions?	SAP SuccessFactors – 45%	SSAP SuccessFactors – 40%	Workday – 40%
Assess your level of preparation for working with HR platforms in future workplaces	High – 25% Average – 55% Low – 20%	High – 20% Average – 60% Low – 20%	High – 15% Average – 50% Low – 35%
Do you plan to use HR platforms in your professional activities?	Yes – 65% No – 5% Not sure – 30%	Yes – 60% No – 10% Not sure – 30%	Yes – 55% No – 15% Not sure – 30%
How do you evaluate training programs related to HR platforms?	Very useful – 40% Useful – 45% Not very useful – 15%	Very useful – 35% Useful – 45% Not very useful – 20%	Very useful – 30% Useful – 50% Not very useful – 20%
Did you have any difficulties using HR platforms during your training?	Yes – 35% No – 65%	Yes – 40% No – 60%	Yes – 45% No – 55%

Source: created by the authors

Table 4 shows that the majority of students are familiar with HR platforms at an average level, but the proportion of those who are well aware is higher at Ukrainian Catholic University compared to the others. Students also rated their experience of using platforms during their studies, with the highest percentage of those who regularly used platforms observed at Ukrainian Catholic University. In terms of the most useful platform, SAP SuccessFactors received the highest scores at the two universities, while students at Ostroh Academy were more likely to rate Workday. The assessment of the level of preparation for working with HR platforms also indicates a different level of readiness of students, with the highest level of preparation at Ukrainian Catholic University and the highest share of low level at Ostroh Academy.

In the United States, training psychology students to work with HR platforms is an important part of the curriculum, especially in organisational psychology and human resources management. In many higher education programs, including master's and specialised courses, students gain practical knowledge of using platforms such as Workday, SAP SuccessFactors, BambooHR, ADP Workforce Now, and others. The training is delivered through interactive seminars, workshops, and simulations of

real-life situations, allowing students to gain experience in working with employee data in an environment as close as possible to the real-life conditions of HR departments. The main goal of the training is to teach students how to manage the employee life cycle, from the recruitment, onboarding, and development process to performance evaluation, career planning and even dismissal. Practical exercises include analysing staff performance, creating individual development plans and assessing risks for the company. An important component is the study of analytics functions and artificial intelligence algorithms that these platforms use to predict employees' career growth, monitor their development, and identify training needs. In Germany, training psychology students to work with HR platforms is also an important part of the educational process, but it is more focused on legal and regulatory aspects. Due to the strict requirements for the protection of personal data under the General Data Protection Regulation, training in Germany focuses heavily on ensuring data security when working with HR platforms. Students gain practical skills in working with platforms such as SAP SuccessFactors and Personio, with a particular focus on HR management, time management and performance monitoring. An important aspect is the integration of these platforms with other

business systems, such as enterprise resource planning (ERP), which allows students to see the broader picture of organisational resource management.

To introduce these practices into the Ukrainian educational system, it is worth creating appropriate training courses that combine theoretical and practical aspects of working with HR platforms. In particular, training modules could be introduced using global HR systems such as Workday and SAP SuccessFactors, where students could learn the functions of HR management, performance monitoring and productivity analysis. In addition, it is important to include legal aspects of data protection and compliance in the curriculum, which is important in the context of modern requirements for the storage and processing of personal information. This will help prepare future HR and psychology specialists for the effective use of HR platforms in the current market requirements, taking into account the specifics of Ukrainian legislation and business needs. SAP SuccessFactors is one of the most popular platforms that offers comprehensive solutions for human resource management, including recruitment, talent development and training. Workday is another powerful system used for HR management, financial planning and analysis. BambooHR is a platform aimed at medium-sized businesses that provides tools for HR management, performance evaluation, and leave management. Personio, despite being a German platform, is also available in Ukraine and is actively used by small and medium-sized enterprises. SmartRecruiters and Work.ua are focused on recruitment and offer solutions for finding candidates and managing the hiring process.

A comparative analysis of HR platforms in the US, Germany, and Ukraine shows significant differences in their use, driven by the level of technological development, legal requirements and corporate needs. In the US, HR platforms offer the widest range of functions and actively use the latest technologies, such as artificial intelligence and machine learning. Germany focuses on legal compliance, integration with ERP systems and detailed reporting. Ukraine is still at the stage of developing HR technologies, but thanks to the introduction of international solutions, it is already beginning to follow the successful practices used in the US and Germany. The functionality of American HR platforms far exceeds the capabilities of solutions available in Ukraine, but local platforms in Ukraine are beginning to meet the needs of small and medium-sized businesses. For example, Prometheus is one of the largest educational platforms for massive open online courses, and Coursera for Ukraine is a localised version of the international platform that offers access to educational courses for Ukrainian students and teachers. In Germany, the main feature is strict compliance with legal requirements and high data security. In terms of integration with other systems, in the US and Germany, HR platforms have a wide range of options for interacting with corporate ERP and customer relationship management systems, which significantly increases the efficiency of their use. In Ukraine, such capabilities are also being developed, but at the current stage, their use is less

widespread. Data security is another important aspect that distinguishes the three countries. German HR platforms have to comply with the strict rules of the General Data Protection Regulation, which requires a high level of data protection. The US also puts a lot of emphasis on data security, especially when using cloud technologies, while in Ukraine, data security is still less regulated but is becoming more important every year.

Recommendations for optimising the use of online platforms in HR management processes

To improve the training of psychology specialists as future HR professionals for companies in Ukraine in order to use HR platforms in their professional activities, it is necessary to develop comprehensive educational programs that take into account current labour market challenges, technological trends and the experience of the United States and Germany. Particular attention should be paid to integrating HR technologies into the curricula of psychology students, focusing on practical skills that they can apply in their professional activities. In the United States, the training of future psychology professionals actively includes training in working with HR platforms, which is an integral part of courses in organisational psychology and human resources management. Students have the opportunity to use platforms such as Workday, SAP SuccessFactors, and others during practical classes and simulations. This allows them not only to understand how to automate HR processes but also to develop skills in analysing employee performance data, planning development and monitoring career growth. An important aspect is the integration of artificial intelligence technologies for analytics-based decision-making. In Germany, psychology training also involves working with HR platforms, but the emphasis is on compliance with regulatory requirements, including personal data protection in accordance with the General Data Protection Regulation (Christopher & Austin, 2021). Psychology students study how to integrate HR platforms with other business systems, such as ERP, to more effectively manage the company's staff and resources. The focus is on automating HR processes, controlling working hours, and ensuring data security. The introduction of such practices into the Ukrainian psychology training system requires the creation of specialised courses on the use of HR platforms, including practical tasks and simulations of real-life situations. This will allow future specialists to acquire the skills necessary to work with modern technologies and prepare them to use HR platforms in their professional activities in the context of the Ukrainian market.

The creation of accessible educational programs and specialised courses on the use of HR technologies for psychologists will allow for more effective implementation of these tools in the practical training of specialists. For example, the integration of platforms such as SAP SuccessFactors, Workday, or BambooHR into training courses will help students gain practical skills in HR management, performance evaluation, providing psychological support

in a team, and process automation. Educational programs can include simulations of working with platforms, which will allow students to master key competencies, including managing confidential information, planning employee development, and tracking their professional growth. Such programs will prepare psychologists to work in large corporations, where digital HR tools are becoming essential for effective human resource management, and will enable them to quickly adapt to the requirements of the labour market.

In the US, solutions such as Workday stand out, offering integrated human resources and financial management, making it popular with large companies. ADP provides payroll processing, HR management, and employment documentation, offering a wide range of HR services. Another platform, BambooHR, is aimed at small and medium-sized businesses, providing easy-to-use tools for managing HR processes. For organisations that require a comprehensive approach to talent management, SAP's SuccessFactors is ideal, covering various aspects of HR. In Europe, platforms such as Personio, which is widely used in Germany for HR management and payroll processing, are popular. Sage People is also widely used in countries where Sage products are used, providing solutions for automating HR processes. The French platform Talentsoft offers talent management and covers various aspects of HR, while Cezar is popular in Eastern Europe, including Poland, focusing on HR management (De Mauro *et al.*, 2018). In Ukraine, notable HR platforms are WebHR, which is popular among Ukrainian companies due to its functionality. HRCloud is a Ukrainian platform that automates HR processes, while SmartHR offers HR management solutions for small and medium-sized businesses. In addition, the Zalishka platform provides a wide range of HR services, including recruitment and HR management, which makes it relevant for many organisations in Ukraine. The choice of an HR platform should take into account the specific needs of the company, as each solution can offer different features and capabilities to optimise HR processes.

In addition, educational programs that introduce HR technology may include courses in HR data analytics, which will allow students to learn how to use analytical tools to assess employee performance and optimise processes. For example, courses can teach students how to analyse performance metrics, collect employee feedback, and apply the results to improve organisational culture. Modules on the psychology of communication in the context of HR technology can also be important elements, helping students understand how to communicate effectively with teams through digital platforms, which is critical in today's work environment. By partnering with companies that already use HR platforms, students can get the opportunity to do internships or practical training, which will allow them to apply theoretical knowledge in real-world settings. Such programs can emphasise the importance of ethical aspects of using HR technologies, including data protection and confidentiality of information. It is recommended to establish cooperation between higher education institutions

(HEIs) and business structures, in which teachers of HR training programs develop their own professional competencies in using various HR platforms to automate business processes in human capital management.

It is also worth establishing cooperation between higher education institutions and business structures for the practice of psychology specialists as future HR, in which psychologists develop their own practical professional competencies in using various HR platforms, standardising and describing business processes in human capital management for their further automation. It also makes practical sense to set up a system for assessing the practical competencies of university graduates during exams, in particular, through practical cases of working with specific HRMS platforms, working with analytics and its interpretation, etc. Improving the level of training of specialists in this area, in particular through the active use of HR platforms, can significantly affect the quality of management practices in the field of psychology, which in turn will improve the professional training of specialists and their competitiveness in the labour market.

DISCUSSION

The study of online HR platforms and their impact on the training of students in the field of human resources management is of great importance for the development of both educational programs and practical aspects of HR management. The data obtained indicate that the integration of platforms into the educational process not only increases the efficiency of learning but also prepares students for the real challenges of the modern labour market.

The research confirms that the use of HR platforms in education contributes to the development of practical skills among students. The study by G. Abitova *et al.* (2024) highlighted the importance of integrating artificial intelligence and automation into talent management processes. Similarly, the study found that students who had the opportunity to work with such platforms demonstrated higher results in assessing their competencies. This is consistent with the findings of A. Akimkhanova *et al.* (2024), who noted that the readiness of future psychologists to design professional activities in innovative educational settings is directly related to the availability of practical experience. Studies show that students become more confident in their knowledge and skills, which allows them to integrate more easily into the professional environment. This is consistent with the work of C. Bulger *et al.* (2020), which examined the impact of psychology on work processes. They pointed out that a clear understanding of one's HR skills and capabilities is critical for success in the labour market. Analysing the results of the study, it can be noted that the majority of students consider interactive platforms to be useful for improving their knowledge of human resource management. This is consistent with the study by D. Dunn *et al.* (2020), which emphasised the importance of quality learning in psychology programs. They argued that the practical orientation of training courses increases student engagement and

quality of education. At the same time, the study revealed some discrepancies with some works, in particular with the study by M. Carvalho *et al.* (2024), which highlighted the problems of training school psychologists to support inclusive education. The authors pointed to the lack of proper training in the use of technology, which makes it difficult to adapt to the new requirements of the educational environment. This problem is also noted in the study, but despite this, students working with HR platforms still demonstrate greater readiness for practical activities.

One of the key reasons why online platforms have not become so popular among some students is the lack of awareness of their benefits. A study by H. Madhvapathy & A. Rajesh (2018) showed that in many countries, including India, young professionals face challenges in integrating new technologies into their studies. This may indicate the need for awareness-raising campaigns on the benefits of online HR platforms in educational institutions. The study found that students with different backgrounds have different perceptions of these technologies. For example, students with more practical classes and internships showed a more positive attitude towards online platforms, which is consistent with the findings of R. Aralbaeva *et al.* (2024) about the importance of developing diagnostic competences in the professional training of psychologists. This emphasised the need to adapt curricula to the specific needs of students, in particular those interested in the technological aspects of human resource management. An important part of the study was to find out the opinions of teachers about the use of online HR platforms in the educational process. The results showed that the majority of teachers believe that such platforms can be an important tool for improving the quality of education. This is in line with the work of S. Bekzhanova *et al.* (2022), who highlighted the need to prepare psychology teachers for innovative actions in an entrepreneurial educational environment. It is also necessary to pay attention to the impact of COVID-19 on the implementation of online platforms. The study by G. Ismailova *et al.* (2021) noted that the pandemic has accelerated the process of digitalisation in education, which in turn has opened up new opportunities for the use of HR platforms in the educational process. However, the challenges associated with distance learning may affect the effectiveness of using such tools, which requires further research.

Further research should focus on analysing the specific tools of online HR platforms and their impact on the development of various competencies in students. An important area will be to study the opinions of students and teachers on the advantages and disadvantages of specific platforms, which will help adapt educational programs to the requirements of the modern labour market. It is also important to study international experience of introducing such technologies into educational institutions, as this can provide valuable insights to improve the system of training in Ukraine. In summary, the study showed that online HR platforms have the potential to significantly improve the process of training students in human resource

management. Despite the existing challenges, the interpretation of the results in the context of other researchers' studies confirms the importance of integrating modern technologies into the educational process. This, in turn, opens up new perspectives for further research that can contribute to the development of educational programs and improve the training of HR professionals. The next section will present the main findings of this study.

Automated HR platforms play a significant role in various fields, ensuring efficient organisation of companies' work and creating conditions for the rapid completion of routine tasks. They help to simplify the processes of recruitment, onboarding, talent management, monitoring employee performance and planning their professional development. In the context of training bachelors of psychology, practical skills in working with such platforms are extremely important, as their future activities may include working in HR departments or in the field of organisational psychology. Skills in working with HR platforms allow students to understand how these technologies integrate into business processes and ensure effective HR management. Psychologists, working as HR specialists, are often involved in the selection of candidates, assessment, training, and development of employees. Automation of these processes through HR systems not only saves time but also minimises human errors, which is a key factor in strategic decision-making. An important aspect of studying for a bachelor's degree in psychology is gaining an understanding of how HR platforms can facilitate communication between management and staff by automatically generating reports, analysing data and offering recommendations based on analytics. This not only contributes to effective HR management but also creates opportunities to conduct psychological research and assess employee satisfaction.

Thus, practical skills in working with automated HR platforms give bachelors degree holders in psychology a competitive advantage in the labour market. They are able to perform their duties in HR departments more efficiently, making them not only professionals in psychological assessment but also specialists with a good understanding of the technological side of HR management. Automated HR platforms also allow psychology students to develop important skills in the field of big data processing, which is critical for modern HR management. For example, through the use of such systems, professionals can track employee performance, engagement in processes, and identify potential problems at an early stage. Mastering these platforms broadens students' understanding not only of the psychological aspects of HR but also of the technological tools that facilitate these processes. Hands-on experience with automated HR platforms prepares students for the modern marketplace, where automation and technology play an increasingly important role in shaping professional skills.

CONCLUSIONS

The study confirmed that the introduction of automated HR platforms in the training of bachelors in psychology

significantly improves the quality of their practical skills. The analysis of the survey showed that most students, after using such systems as SAP SuccessFactors, Workday and BambooHR, demonstrated an increased level of understanding of the main functions of HR platforms, in particular, in terms of recruitment, performance evaluation and staff development management. The quantitative results of the survey show that after the introduction of these platforms, the level of students' readiness to work with HR technologies has increased. Qualitative indicators have shown that students have become more confident in using automation tools that allow them not only to perform administrative tasks efficiently but also to provide psychological support to staff, in particular through the analysis of their professional development and personal characteristics.

The experience of training psychology students to use HR platforms in the US, Germany, and Ukraine demonstrates different approaches to integrating these technologies into the educational process, which depends on the level of market development, legal regulation and the culture of working with technology. In Ukraine, the level of integration of HR platforms into the educational process of psychology students is still under development. Implementing the experience of the US and Germany can significantly improve the training of specialists. The creation of specialised training courses that combine the study of modern HR platforms and practical tasks on their use will allow students to acquire the necessary skills to work with staff in modern conditions.

The obtained results confirm that the integration of HR platforms into the educational process is necessary for the training of competitive specialists in the field of psychology, especially in the context of the digitalisation of management processes. It is important that the introduction of

such platforms allows students not only to master practical tools but also to develop data analysis skills, which is of great importance in psychological practice. The study found that HR platforms can be an effective tool for psychological HR management, as they allow optimising the processes of interaction with employees and automating a number of routine tasks, freeing up more time for individual work with staff. Teachers should pay attention to the integration of various HR platforms into teaching, in particular those used in international practice, to prepare students to work in a globalised environment. In addition, attention should be paid to improving the level of data security and ethical aspects of using automated systems in HR, which will be an important addition to professional training.

A limitation of the study was the sample of students, which may affect the results due to the specifics of the HR platforms used during the study. Further research should cover more universities and different HR systems to obtain broader data and a deeper understanding of the impact of different technologies on the training of future psychology professionals. The main areas for further research could be the study of the impact of different types of HR platforms on the development of students' social and communication skills, as well as the analysis of the effectiveness of their use in various areas of psychological practice. In particular, it is worth investigating how automated platforms can be used to work with staff in specialised areas of psychology, such as organisational or clinical psychology.

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CONFLICT OF INTEREST

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Практичні навички бакалаврів психології щодо роботи з автоматизованими HR платформами

Анотація. Метою було виокремлення рекомендацій для майбутніх фахівців у сфері психології щодо використання сучасних human resources (HR) платформ. Проаналізовано функціональні можливості сучасних онлайн-платформ, що використовуються в HR-менеджменті. Описано вивчення досвіду провідних компаній, опитування студентів та викладачів та проведення порівняльного аналізу HR платформ у трьох країнах, а саме Україні, США та Німеччині. Основні результати дослідження продемонстрували, що впровадження автоматизованих HR платформ у навчальний процес сприяє суттєвому покращенню практичних навичок бакалаврів психології. Студенти набули не тільки базових знань, але й досвіду роботи з сучасними HR системами такими, як SAP SuccessFactors, Workday та BambooHR, що дало їм змогу краще підготуватися до майбутньої професійної діяльності. Аналіз результатів показав, що використання таких платформ допомогло студентам освоїти ключові компетенції у сфері оцінки продуктивності та забезпечення прозорої комунікації в команді. Впровадження HR платформ позитивно вплинуло на рівень обізнаності студентів щодо сучасних інструментів управління персоналом, підвищило їхню адаптивність до новітніх технологій і готовність працювати у віддалених та міжнародних середовищах. Інтеграція таких платформ у навчальні програми допомагає студентам бути готовими до реальних викликів сучасного ринку праці, де HR технології займають ключову позицію. Студенти, які навчаються працювати з цими платформами, набувають конкурентні переваги, оскільки багато компаній шукають фахівців, які можуть ефективно використовувати цифрові технології. Особливу увагу варто звернути на підвищення рівня безпеки даних, що стає критичним у роботі з HR платформами, оскільки персональні дані працівників потребують захисту від несанкціонованого доступу. Дане дослідження може бути використане викладачами вищих навчальних закладів та HR-менеджерами для впровадження сучасних HR платформ у навчальний процес та підготовку майбутніх фахівців у сфері психології

Ключові слова: менеджмент; цифрові інструменти; автоматизація процесів; інноваційні підходи; програмні рішення; онлайн-платформи

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Empathy as a professional quality of a counselling psychologist

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Abstract. The purpose of the study was to identify the role of empathy in a person's professional activity and in his/her life in general, as well as to study the impact of empathy on the mental state of an individual. This study was formed on the basis of a systematic review of materials that identified correlates of the impact of the empathic level on the psycho-emotional state of a person, as well as explained the role of empathy for a person from the opposite aspects of its study. The results of the study were based on the levels of comparative indicators demonstrated by samples of people in communicative fields of activity, on the basis of which the relevant conclusions were drawn regarding the role of empathy in the professions of counselling and contact with people. The results showed that the role of empathy in people's lives and activities is an important criterion, but in some cases, it determines the negative aspect of action. The technology of expressing empathy was based on several criteria depending on its type. Cognitive empathy, affective (emotional) empathy, and empathic care represented different aspects of expression, adjusting different moments in the course of a communicative action. In particular, the factors that negatively affected the manifestation and development of the respondents' empathic abilities were mainly the lack of proper experience, education, understanding, constraint or excessive focus on their own position. At the same time, it was clear that the level of empathy depends on the way an individual thinks and is an incentive for prosocial behaviour, which, in turn, is an innate, evolutionary human characteristic. According to the obtained indicators, a high level of empathy positively regulates communication relations in society, while a higher level of empathy contributes to the development of depression, psychosomatic disorders, increases anxiety and stimulates obsessive-compulsive behaviour. However, it is worth noting that the importance of the role of empathy for a psychologist is controversial and requires more attention to define its essence in detail

Keywords: communication; reconstruction; metaconsciousness; awareness of the meaning of actions; prosocial behaviour

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INTRODUCTION

Given the current living conditions, where the prevalence of stressful aspects is increasing, the question of finding a qualified psychologist is becoming more and more important for people. However, the issue of choosing a specialist psychologist is determined by his or her competence in counselling, taking into account different life circumstances and the needs of the patient. A qualified counselling psychologist must possess a set of characteristic qualities

that help in understanding the emotional state of another person and identifying their emotional characteristics, which facilitates the diagnosis and treatment of many psychological disorders. However, there have been numerous disagreements among the choice of qualities that form a psychologist's competence, and no consensus has been reached. One of the main qualities of a counselling psychologist is considered to be a pronounced level of



empathy for patients, which reveals the specialist's ability to build successful personal and working relationships. On the other hand, increased empathy for the negative emotions of another person can provoke negative consequences for an individual who shows compassion and pity for the opponent. As negative emotions increase, the likelihood of mental illness and certain nervous disorders increases. Thus, the study of the impact of empathy on human life is one of the most pressing issues in the psychological and communication fields.

Given the current literature, it has been found that empathy is mostly considered as the foundation of a psychologist's professional activity. Determining the empathic level of both a specialist and an individual is a crucial link in building quality interpersonal relationships. A person's tendency to empathy determines their ability to self-realization in society (Van Tienen *et al.*, 2024). However, given the different types of empathy and various aspects of life that contribute to its increase (the ability to express one's own feelings, the ability to listen to the interlocutor), or vice versa, lead to a decrease (culture, innateness, etc.), it is determined that systems that allow measuring a person's empathic properties are not accurate. Given the results similar to previous studies, it also turned out that people can belong to different behavioural types according to their empathic disposition.

Thus, personal behaviour can be divided into two categories: prosocial and antisocial (Brill & Nahmani, 2017; Schramme, 2024). The fact that empathy affects human behaviour raises the issue of studying the impact of the empathic level on mental health, since the behavioural component is an expression of the individual's neurophysiological and mental characteristics. In addition, other studies have shown that the effectiveness of psychotherapeutic treatment is not based solely on the empathic level. The high level of professionalism of a psychologist is actually determined by his or her education, experience, ability to think divergently, etc. Thus, empathy can only act as an intermediary and be one of the main qualities of a specialist, but cannot be a decisive criterion for assessing his or her professionalism.

Taking into account the review of scientific works that determined the importance of empathy in the field of social professions, the problem of this study was to identify numerous opinions about the use of empathy and its impact on human psycho-emotional health, which, in turn, focused on different aspects of its study. Focusing on the amount of information about the study of empathy and the research on its role in the modern world, a sufficient number of statements about the importance of empathy in the psychotherapeutic field were found (Ramadhanti *et al.*, 2023). In general, these statements related to the criteria for assessing the empathic level of professionals, which determined the positive side of empathy in a person's life. Taking into account the aspects of assessing the empathic level, it is determined that they represent a self-assessment and an independent assessment of the level of empathy

expressed or not expressed during the communication process. The main gap in these studies was the inclusion of self-assessment of empathy in determining its level, since an individual's assessment of his or her own empathy does not reveal the presence of a high degree of empathy. In contrast, according to current research, there are conflicting views on the definition of empathy as a key characteristic for a counselling psychologist (Pang *et al.*, 2022; Ren, 2024). Given the review of the results of these studies, it was determined that empathy plays an important role in shaping the mental health of an individual, but mostly negative. Thus, there is a distinction between affective (low-level) empathy, cognitive empathy, and empathic care, which helps an individual to use methods of communication that encourage action (Nakao, 2021). In this regard, the question arises of considering empathy as a manipulative aspect expressed by one person to another, taking into account their own goals and beliefs. Thus, the negative aspects of empathy should be considered as a counterbalance to its necessity for a person's professional activity and life in general.

The objectives of this study were to investigate empathy in terms of two opposing opinions of its meaning (positive and negative), to identify the criteria for the impact of a high empathic level on the psycho-emotional state of a person, to compare the effective criteria from the materials used for this study in order to determine the general opinion about the importance of empathy as a quality of a counselling psychologist's professionalism. Thus, the purpose of this study was to identify the importance of empathy in the psychological field of activity and to determine its impact on the psycho-emotional state of a person.

LITERATURE REVIEW

Given numerous interpretations of empathy, in a general and at the same time simplified definition, empathy is seen as the ability and desire to gain perspectives, share views, beliefs, and experiences of other people, and therefore as a confirmation and expression of understanding to a person in the field of communication (Ramadhanti *et al.*, 2023). According to the interpretations of information sources and studies related to the definition of empathy as a professional quality for specialists in the psychological system of education and practice, it is a psycho-emotional disposition to identify hidden messages from the patient. At the same time, empathy was defined as the main quality of a psychologist, which reveals his/her professionalism and competence. Modern studies have mostly tended to argue that empathic manifestation is the creation of a certain state that allows a person to understand and feel loyalty to him or her, trust in others, which, in turn, is a component of a sense of security and confidence in the modern world (Pang *et al.*, 2022).

Taking empathy as the main field of practice in psychotherapy, the concept of empathy becomes quite centralised. From a mental state perspective, those with high levels of empathy are more likely to coexist well with others (Nakao, 2021). Having empathy allows a person to create successful intrapersonal relationships of any kind, whether

within the family circle, work or non-work environments. Therefore, the lack of empathy, or its absence, is considered a separate characteristic for such conditions as social discomfort and narcissistic personality disorder. In addition, for mental health professionals, including psychotherapists, psychologists, and psychiatrists, empathy for patients is an important component of their work (Schramme, 2024).

A number of other scientific studies have thoroughly examined the part of empathy devoted to the therapeutic process of observing and listening (Li, 2019). At the same time, S. Van Tienen *et al.* (2024), in their study, identified a number of obstacles in psychotherapeutic listening that can be considered as direct dangers to empathic behaviour: laziness, constraint, own beliefs, doubt, and lack of focus. Research in this area also demonstrates how pronounced the activity of a certain area of the human brain is when detecting a false emotional state, i.e., imitating emotions in patients or simply observing the emotions of others. In addition to this, scientists draw characteristic conclusions about how ordinary observers of emotional states are able to feel the same, but to a lesser extent (Biletska, 2021). Furthermore, internal representations of facial expressions of other people during communication, and common neural circuits have also been recorded in relation to the tone of voices, sensations, touch, disgust, and expression of suffering.

Given the research on empathy over the past 5 years, there is no consensus on whether the criteria of empathy, such as compassion, accepting other people's points of view, and sharing their emotions, i.e., sharing experiences, can be considered elements of empathy. Nevertheless, there was evidence that these elements can be prioritised (Serrat, 2017; Onwuka, 2024). Scholars have suggested that these elements may be interconnected among most social individuals, despite the fact that they do not actually have any associative interpretations. At the same time, the lack of clarity about the extent to which the elements of empathy are related has contributed to the general confusion about the definition of empathy, and has led to a rather small percentage of research in this area. According to experts, few studies have actually analysed the development of empathy in normal everyday activities in order to gain insight into the concomitant frequency of emotional communication, attitudinal perception, and compassion (Warren *et al.*, 2021). Moreover, research shows that most of the disclosure of empathy has been focused on painful perceptions, i.e., feelings of pain and pity. It is precisely these kinds of characteristics that can provide false beliefs about what empathy, its perception and expression can actually be. However, as a meta-analysis of empathy neuroscience research has shown, the anterior cingulate cortex and the dual frontal insula are part of the core network of empathy (Eklund & Meranius, 2021). At the same time, subsequent studies have shown how consistent this activation is, possibly due to the overrepresentation of research showing empathy for pain. In the absence of information about how empathy is experienced in human life, it is not possible at this point to be sure that the findings of empathy research

that have been drawn from the current literature are free of any flaws (Ren, 2024).

Empathic sensitivity can also contribute to personal subjective well-being, but the evidence is contradictory. While some scholars argue that empathy increases well-being (social health), other researchers point out that empathy can lead to emotional burnout and self-isolation (Fong & Bakar, 2023; Ramadhanti *et al.*, 2023). Other authors provide evidence that empathy is neither positive nor negative, but only leads to either compassion or personal distress, which are characterised by different psychology and consequences. It is difficult to know to what extent real-life social relationships will manifest their complexity and adhere to the boundaries of these taxonomies. Based on research in laboratories, it has been found that feeling empathy most often leads people to engage in prosocial behaviour (Vázquez-Campo *et al.*, 2019), but there have also been claims that empathy can also lead to antisocial behaviour, for example, in the form of increased competition (Brill & Nahmani, 2017; Gilels *et al.*, 2022) and violations of ethical dignity. Instead, prosocial behaviour is determined by a high level of empathy, which encourages a person to take selfless actions towards a person in distress.

MATERIALS AND METHODS

The present study is purely theoretical in nature. The materials for this study were obtained by reviewing scientific publications on empathy on the global platforms Sage and the Swiss platform of scientific publications – Frontiers. To summarise the results of this study, research papers from the Patient Education and Counselling and Healthcare scientific base were used. The search criteria were: the concept of “empathy”, healthcare, psycho-emotional state and level of empathy, prosocial behaviour, and key qualities of a psychologist's professionalism. In general, all the materials were intended to answer the question of the importance of empathy in human activities related to communications. The overall quality of the materials included in this study only partially met each of the selection criteria. The aspects that met the criteria were selected from the total volume of methods and their indicators that correlated in the studies used. The main reason for the difference between the results of the two materials used was the contradictions concerning the importance of empathy for a person. In the present study, the comparison of these two contradictions formed a unified opinion about empathy as a quality of professionalism of a psychology specialist.

The first material on which this study was based was the work of M. Fuller *et al.* (2023), which examined the theory of empathy in two aspects, namely, as an indicator of self-assessment of the level of empathy and an indicator of independent assessment of its manifestation. The sample in the study was made up of students from the Faculty of Behavioural Sciences (Communications), University of Twente in the Netherlands. The study was based on the idea of how empathy affects communication processes. To compare two contradictions regarding empathy as a factor for

professional activity, the study of mental health symptoms in the presence of a high level of empathy was taken as the basis for the indicators (Huang *et al.*, 2020). The sample for the researchers' study was teachers from 544 random pre-schools in Beijing, China. In both materials used for this study, the indicators were evaluated to create a system of comparisons of two contradictions concerning empathy as a key aspect of professional activity.

It was the indicators of these two materials that revealed the most specific contradictory effect that became the basis for this study. The first material used for this study defined in detail the role of empathic communication skills in the process of professional counselling of others. This served as an effective basis for identifying correlates that help in the expression of empathy at both low and high levels. The second study used for this research addressed the issue of psychosomatic consequences of empathy at a high level of expression, using the Symptom Checklist 90, multivariate analysis of variance (MANOVA) and Analysis of Variance (ANOVA). Correlates of experience in communication activities were used to study in detail the impact of empathy depending on the amount of time (years or months) spent in communication with other people.

The following theoretical materials, which this study relied on in the process of forming effective conclusions,

mainly concerned the study of cognitive indicators of empathy and empathic care (Pang *et al.*, 2022), the affective (low-level) theory of empathy. The formation of the main indicators that showed the difference in the need for empathy for effective counselling of patients in psychotherapeutic treatments was based on the most likely cases of decrease and increase in empathic processes, which were formed on the basis of additional thematic literature based on research on the reconstruction of human behavioural processes (Eklund & Meranius, 2021; Bru-Luna *et al.*, 2021). Also, this literature has become the basis for the study of empathy factors that affect the mental state of a person.

RESULTS

The first material used made it possible to establish how empathy is manifested in society by studying its two aspects, i.e., self-assessment and independent assessment of the empathic level. In turn, establishing the relationship between these correlates established its importance in the communication process with other individuals. In the end, the results in the material used confirmed that the self-assessment of empathy did not reveal any value that would show the professionalism of the specialist. On the contrary, the indicators of independent assessments showed either high or low levels of counselling effectiveness (Table 1).

Table 1. Indicators of the respondents' empathic level according to clients' and their own assessments

Group number	Age	Gender	Assessment of customer empathy	Assessment of observer empathy	Duration of counselling
1	22	Female	1.78	4	60
1	25	Female	1.78	3	60
2	22	Female	1.65	4	50
1	22	Female	1.21	2.5	48
2	22	Female	1.14	2	28
2	20	Female	1.06	4	54
2	31	Female	1.06	3.5	50
2	24	Female	1.06	4	36
1	25	Male	-0.07	1.5	32
2	22	Male	-1	2.5	64
2	22	Male	-1	2	37
2	22	Female	-1.11	2	45
1	20	Female	-1.22	1.5	44
1	22	Female	-1.22	2	35
2	25	Male	-2.19	1	31
2	20	Male	-2.7	1.5	24

Note: client empathy score: average of scores based on two assessments (two clients); observer empathy score: scores on a 4-point scale (1 – low level of empathy, 4 – high level of empathy)

Source: M. Fuller *et al.* (2023)

It should be noted here that the indicators in the first article were obtained with regard to cognitive and affective empathy. Cognitive empathy is defined as a person's ability to understand and be aware of the feelings of others. Affective empathy, on the other hand, is defined as an internal reaction to the emotional state of another person. In other words, affective empathy is the ability to understand other people's emotions, and affective empathy is the ability to

feel the emotions of another, subconsciously putting oneself in the other's shoes. Further, taking into account these indicators, the connection between human behaviour in the process of communication and the level of their empathy was determined. The article uses the indicators of independent assessment, as they are the only ones that are essential for determining the effectiveness of counselling. According to the indicators, a high level of empathy was

indicated by open behaviour along with the level of confidence of the person who counselled the client. Aspects of empathic behaviour are usually determined by certain criteria, namely: eye contact, gestures, posture, body movements, postures, intentions, and forms of questions asked of a person. In order to find an explanation for these correlates of empathic behaviour, this study examined empathy from a neurophysiological perspective.

In terms of neurophysiology, in humans, empathy is ensured by a chain of interacting neural areas that are distributed among themselves and often have recursive communication, including the brainstem, amygdala, hypothalamus, and islets, neuroendocrine processes involved in social behaviour and emotional states, as well as parasympathetic and sympathetic branches, which represent antagonistic and coordinated regulation of internal states, which together form the central nervous system. On this basis, empathic experiences, as well as the stimuli that generate the desire to care for others, arise through the interaction of many brain regions with the autonomic nervous system as well as the neuroendocrine system (Li, 2019). There is a certain activation of neural connections, or the so-called pain matrix, that is involved in shaping the experience of pain. According to the activation of the pain matrix, the auxiliary motor area, the grey area of the periaqueductal space and the amygdala, which are covered by this matrix, are activated. This network of neural connections is activated when a person observes other people's emotional signals, i.e., facial expressions, body movements (including injuries to body parts), or when a person imagines the pain and suffering of another person. In general, the pain matrix is activated by any action or signal that indicates that someone will receive a painful stimulus. Activation of the pain network may also be insignificant for sensory pain perception, but may instead be related to more general survival circuits, such as aversion and fear (flight when exposed to certain dangers and risks). Anxiety about other people's distress involves several brain areas that are distinct from the pain matrix. These areas are the ventromedial prefrontal cortex, the hypothalamus, the amygdala, and the area associated with the affective systems in the brainstem, which in turn dates back to the evolutionary period. Otherwise, this area is defined as the reticular formation, or "human unconscious" (Bru-Luna *et al.*, 2021).

Thus, it can be concluded that humans have been caring for others since evolution. The prefrontal cortex, or default system, is responsible for relationships with other people, both social and non-social. The prefrontal cortex integrates important affective information that will be used to shape behaviour to care for others. Therefore, people with a high proportion of dispositional empathic concern are involved in precious selflessness, and this connection was supported by neural activity in the central tegmental area, caudate nucleus, and prefrontal cortex. Instead, people with negative or absent sensitivity to the distress of others rebel as a result of abnormal neural responses. Such abnormalities can be

identified in a person's childhood. Alienating or ignoring people who are in a state of distress is actually a very strong criterion for antisocial behaviour. In such people, the corresponding neurons in the brain are not activated in a certain (excited) way, so their reactions to the emotional state of other people may be absent.

In order to be motivated to care for others, or to be concerned about their feelings, one must be empathically and affectionally "aroused" and expect the personal distress that has arisen from the shared distress to end. Overall, clinical and sociological research in neuroscience strongly supports the view that emotional reactivity in general, and especially sharing another person's suffering, is crucial for maintaining prosocial behaviour (Eklund & Meranius, 2021). The affective experience of discomfort that comes from witnessing others in pain, suffering, or sadness increases the desire to help. However, certain types of prosocial behaviour (such as helping and comforting) can also arise from empathy. In general, prosocial behaviour is defined as any action performed to alleviate the needs of life or improve the well-being of one organism by another. At the same time, prosocial behaviour contributes to the recipient's empowerment and has some consequences for the benefactor. It is possible to call a particular human behaviour "prosocial" – for example, if it includes empathy-motivated everyday actions – only when they are "unselfish". This, however, misses the ultimate goal of defining such behaviour, as prosocial behaviour is extremely vulnerable to public space and the relationships that emerge between people. Empathy and prosocial behaviour are definitely influenced by a person's genetics, as well as the oxytocin receptor. Ultimately, the link between prosocial behaviour and the oxytocin receptor is mediated through empathic caring and world-view adoption, as these components are very important for human empathy. At the same time, empathy does indeed trigger prosocial behaviour.

In this regard, it is determined that hand movements, body position, eye contact between people, etc. are caused by the activation of certain brain systems responsible for the level of empathy. Based on the material used for this study, the indicators of posture and gestures of the respondents during the interview (counselling) of clients were different (Table 2). Participants with low empathy scores often touched their own faces and picked up objects in their hands, which indicated the respondent's uncertainty and stiffness during the session. Instead, participants with high empathy scores behaved more relaxed. This was expressed in the fact that they nodded their heads more often to indicate understanding of the client, repeated movements after them to inspire trust and attitude. In fact, such correlations helped to establish a link between the assessment of people's empathy levels. For example, if a person has a high level of empathy, his, or her behaviour will be calmer and more confident in the process of communication. At the same time, people with a low level of empathy feel more constrained and insecure, which hinders effective communication.

Table 2. Respondents' behaviour in the process of communicating with customers, according to the expression of high and low empathic level indicators

Respondents' behaviour	Indicators that showed a high level of empathy	Indicators that showed a low level of empathy
Body position (posture)	Moderation of movements, calmness, relaxation	Frequent changes in body position, nervousness, anxiety
Movements (hand gestures)	Open palms, synchronization of actions with customers, in the course of each dialogue	Using objects (picking them up)
Intention to ask a question	Identify and analyse the topic in more detail (deepening the topic)	Search for additional data, please explain
Paraphrasing the context to get the point across	Inserting the meaning or relationship of what has been said	Summing up without providing arguments and meaning
Focus on solving the customer's problem	The client's decisions, ideas, statements, and opinions serve as a guide	Offering own judgements, decisions, opinions without taking into account the needs of the client

Source: M. Fuller *et al.* (2023)

In general, in the first material used, the role of empathy was manifested as a very significant indicator that gave a high assessment of the communication level. Given its results, it is worth noting that empathy is defined here as the basis of people's communicative behaviour. Instead, a person's level of empathy is determined by their behaviour. Based on the review of the indicators of the material, it is noted that confident and open behaviour has a positive effect on the independent assessment of a person's empathy. This leads to the conclusion that a high level of empathy facilitates the exchange of feelings or experiences between individuals, increases the level of understanding and compassion, determines the principle of social interaction and creates positive conditions for the development of communication skills, which enhances the positive effect of communication, since humans are social animals. Empathy helps to harmonise the process of communication by making it emotionally coloured. Accordingly, people feel more trust in each other in the

process of communication, which is explained by the release of large amounts of oxytocin.

To test the assumption that empathy has an impact on mental health, this study used a 9-item ANOVA on a sample of first, second, and high (exemplary) level teachers in preschools in Beijing. The correlational data from the material used appropriately described the mental health status of the respondents according to their empathy and with regard to their work experience (Table 3). The results revealed that there was a significant relationship between all 9 groups of psycho-emotional state patterns and 4 groups of respondents' teaching experience. According to the results obtained, it was concluded that there were quite significant differences between each group of work experience for 9 characteristics of the psycho-emotional state, namely: due to the increase in work experience, the severity of psycho-emotional health increases for all nine characteristics. Thus, the relationship between work experience and the level of empathy has proven to exist.

Table 3. Indicators of models of psycho-emotional state and empathy by groups depending on work experience

	Group 1 (n = 1,246)		Group 2 (n = 1,146)		Group 3 (n = 645)		Group 4 (n = 1,303)		ANOVA among the four groups during working hours	General indicators for all groups (n = 4,343)	
	Ind.	Av.	Ind.	Av.	Ind.	Av.	Ind.	Av.		Ind.	Av.
MPS											
PS	1.6	0.64	1.8	0.7	2	0.8	2.15	0.82	F(3.43) = 119.01, (p<0.01)	1.90	0.8
O-C	1.87	0.7	2	0.7	2.1	0.77	2.25	0.8	F(3.43) = 60.07, (p<0.01)	2.07	0.76
IS	1.64	0.63	1.76	0.66	1.85	0.74	1.97	0.74	F(3.43) = 51.33, (p<0.01)	1.80	0.7
DP	1.58	0.64	1.75	0.7	1.86	0.78	2	0.78	F(3.43) = 76.14, (p<0.01)	1.80	0.74
Anx.	1.56	0.6	1.7	0.67	1.8	0.74	1.91	0.74	F(3.43) = 60.46, (p<0.01)	1.74	0.7
PT	1.5	0.6	1.62	0.62	1.7	0.67	1.83	0.7	F(3.43) = 55.44, (p<0.01)	1.66	0.66
H	1.52	0.61	1.7	0.68	1.8	0.73	1.95	0.79	F(3.43) = 83, (p<0.01)	1.75	0.7
PA	1.41	0.57	1.51	0.61	1.58	0.65	1.64	0.7	F(3.43) = 30.34, (p<0.01)	1.53	0.64
PT	1.51	0.56	1.61	0.58	1.7	0.63	1.8	0.68	F(3.43) = 52.3, (p<0.01)	1.65	0.63
EMP											
FN	3	0.58	3.04	0.6	3.05	0.6	3	0.6	F(3.43) = 2.81, (p<0.05)	3.02	0.6
EC	3.7	0.5	3.66	0.52	3.7	0.54	3.62	0.51	F(3.43) = 5.3, (p<0.01)	3.66	0.52

Table 3. Continued

	Group 1 (n = 1,246)		Group 2 (n = 1,146)		Group 3 (n = 645)		Group 4 (n = 1,303)		ANOVA among the four groups during working hours	General indicators for all groups (n = 4,343)	
	Ind.	Av.	Ind.	Av.	Ind.	Av.	Ind.	Av.		Ind.	Av.
PsT	3.61	0.6	3.53	0.6	3.56	0.62	3.5	0.57	F(3.43) = 7.5, (p < 0.01)	3.55	0.6
ID	2.73	0.54	2.84	0.53	2.85	0.57	2.9	0.55	F(3.43) = 20.1, (p < 0.01)	2.83	0.55

Note: Ind. – indicator; Av. – average value; MPS – modules of psychoemotional state; PS – psychosomatics; O-C – obsessive-compulsive disorder; DP – depression; Anx. – anxiety; PT – paranoid thinking; H – hostility; PA – phobic anxiety; PT – psychoticism; EMP – empathy; FN – fantasies; EC – empathic care; PsT – perspective thinking; IS – interpersonal sensitivity; ID – individual distress

Source: H. Huang *et al.* (2020)

The results showed which of the nine symptoms had the most serious grounds for concern. According to the verified indicators, it turned out that obsessive-compulsive behaviour, psychosomatic symptoms, and symptoms of depression were the most significant threats to a person's mental health. However, it was found that the biggest problem among the three main symptoms was the manifestation of obsessive-compulsive behaviour. The second most difficult symptom was psychosomatic disorder, which was observed mostly in the group with work experience of 2 to 5 and 5 to 10 years. The third most important criterion was depression among the participants, which was mostly observed in the group with 10 years of work experience (Table 4).

This conclusion indicates that with the experience of counselling and teaching (i.e., social contact), the symptoms of a worsened psycho-emotional state increased. Finally, having determined the level of interaction (influence) of such a state of psychological health on a person's empathy, a characteristic conclusion was made that the probability of a decrease in the empathic level of a person in the course of his or her work experience is quite significant. The results made it possible to clearly understand the emotional state of the respondents over the years of their work experience in interaction with other people, thereby showing that the level of empathy was significantly reduced with the growth of people's depressive state.

Table 4. Indicators of the impact of empathy on the psycho-emotional state of a person according to the respondents of the sample of primary school teachers in Beijing

LTS	0.17	0.16	0.19	0.18	0.19	0.13	0.17	0.17	-0.05	-0.05	-0.06	0.08
MPS												
PS	0.84	0.79	0.85	0.87	0.79	0.75	0.76	0.82	0.2	0.07	-0.09	-0.48
O-C		0.87	0.90	0.88	0.81	0.78	0.81	0.85	0.38	0.11	-0.09	0.57
IS			0.91	0.89	0.83	0.83	0.89	0.9	0.37	0.06	-0.17	0.57
DP				0.92	0.85	0.82	0.87	0.9	0.35	0.05	-0.16	0.55
Anx.					0.84	0.85	0.85	0.9	0.36	0.05	-0.14	0.55
PT						0.77	0.85	0.84	0.32	0.01	-0.22	0.54
H							0.79	0.83	0.29	-0.01	-0.17	0.49
PA								0.88	0.32	-0.02	-0.21	0.49
PT									0.34	0.02	-0.17	0.53
EMP												
FN										0.43	0.2	0.53
EC											0.6	0.27
PsT												-0.06
ID												

Note: LTS – length of service (p < 0.01)

Source: H. Huang *et al.* (2020)

Thus, the teachers who agreed to voluntarily participate in the study expressed symptoms related to their mental state mainly at the levels of “slightly” and “moderately”. At the same time, according to all 9 models of mental health, they had the highest scores. Thus, the most serious symptoms of the mental health condition provoked by empathy were depression, obsessive behavioural disorder and psychosomatic disorders, which only increased with the years of work. According to the second material used for

this study, empathy was considered as a criterion that provokes the emergence of negative mental health conditions. In other words, the role of empathy was defined as a major factor that provokes the onset or aggravation of depression, obsessive-compulsive disorders, anxiety and psychosomatic illnesses. Contrary to the results of the first article, the role of empathy was refuted in this study, in accordance with the opposite aspect of its high level in humans. That is, in contrast to the fact that a high level of empathy helps

to build healthy human relationships, it, on the contrary, hinders the construction and normalization of an adequate level of mental health.

Comparing the two materials used in this study, it was determined that in both cases, empathy was a response to negative emotional colours. Compassion, concern, and shared experiences are correlates of a person's negative emotional state. This implies that one person's empathy is a kind of reaction to the pain of another person – his or her interlocutor. Instead, the difference between the materials used was the study of empathy from its different origins, namely, the question of its origin and manifestation, and the question of the consequences it provokes. Instead, in both studies used, the indicators were aimed at determining the role of empathy in human life. In the first case, empathy laid the foundation for effective communication with people, while in the other, it was a criterion for a number of negative consequences that acted against a person, namely, against his or her mental well-being. Based on this, and returning to the purpose of this study, it is determined that empathy, although it is the main criterion that determines the professionalism of a person, and in this case, a counselling psychologist, is not decisive.

Based on the data from the materials used, this study outlined the types of empathy and general methods of its expression in counselling psychology. Depending on the type, empathy was divided into three categories of perception: cognitive, affective and empathic care. In the course of this study, cognitive empathy was studied as the ability to communicate, which focused on the thoughts (of other people and empathic care, which is the assistance to other individuals in applying methods that provoke action. It is according to the latest results of the study of the impact of empathy on the mental state that empathic care has been shown as a collective work with setting appropriate goals (i.e., teaching), as an example for a counselling psychologist. As for affective empathy, it is the ability to accept other people's emotions as they are, which is useful for building (establishing) emotional relationships with other people.

As for the general methods of expressing empathy, the indicators of the first study in this paper (based on respondents from the communication sphere of activity) were shown as an example. Facial expressions, hand movements, and body posture of the respondents were methods of expressing empathy for their clients, which in turn had a positive impact on the assessment of the communication session. Other methods aimed at expressing and developing empathy were also identified for psychologists. These included: self-reflection as a method of developing empathic tendencies that helps a person to remain open to the positive impact of communication and in-depth expression of emotions, which is a method of observing and therapeutic listening to clients that helps a counselling psychologist to pick up on hidden messages, hidden emotional states, etc. Clients, like all people, are prone to suppressing their own emotions and feelings, even during a session with a specialist. This proves that empathy is an

important component in the psychological field. Among the recommendations for the use of empathy in the psychological field, the following were highlighted. Based on the results of the study of empathy assessment in two aspects, participants with low levels of empathy focused on adherence to the hierarchical position of consultant-client, which was a mistake. Counselling is based on equality between the client, or the patient, and the person providing services or conducting the therapy session. The next mistake was the formulation of questions. Questions should not express one's own opinion or prejudice, but should focus on the client's position (point of view). The questions asked should express the correctness and clarify the patient's positioning. Instead, among the respondents with high empathy scores, the correct positions were used. Therefore, during the session, a counselling psychologist should use body language, be ready for corrections from the patient, and demonstrate understanding through the use of declarative statements.

Thus, based on the analysed theoretical aspects, it is worth noting that this study examined the pros and cons of empathy both in the process of communication in counselling and in the work process of building relationships with people in order to inspire trust through mutual understanding. There are certain criteria that increase the level of empathy or, on the contrary, provoke its decrease. Mostly, this happens in the absence of a certain level of education and understanding of the empathy aspect, which helps to maintain the proper level of the communication process. Considering empathy as an emotional component of social interaction, it was found that empathy can have a negative impact on the psycho-emotional state of a person, while it was determined that empathy was key in the process of independent evaluation of counselling. Thus, according to a systematic review of all the materials used for this study, it was identified that empathy is an important mediator for communication in the communication, educational and psychological spheres of activity in general. Empathy allows a counsellor to be more understanding and, at the same time, loyal to the feelings of another person (patient), which ultimately inspires trust. Empathy also serves as a foundation for effective socialization and identification of the individual in society. This is because a high empathic level allows a person to conduct a meta-analysis of their behaviour, thereby "correcting" it positively. However, in contrast to the communicative aspects of human activity, empathy has a rather negative impact on the state of psychological health. This can be explained by a number of key aspects of empathy, namely: compassion, concern, worry, and the ability to share other people's emotions, which are mostly negative (pain, anxiety, etc.). At the same time, empathy may be one of the main criteria of professionalism, but it is by no means decisive and obligatory. Therefore, at the stage of forming the key aspects for the effectiveness of a psychologist's work, it is worth focusing on other elements of psychological competence.

DISCUSSION

The study of empathy as a necessary quality for the profession of a counselling psychologist and for a person in general has been considered a necessary issue that has been researched and discussed by many specialists today. Among them are H. Riess (2017), E. Warren *et al.* (2021), and M.I. Onwuka (2024), who studied the impact of social interaction on the level of empathy in a general context. However, this issue was not closed, fully formed and studied in detail. In general, the study of the concept of “empathy” and its necessity in human life has been and remains quite difficult to understand. If we take empathy as a key quality of a counselling psychologist, or psychotherapy in general, the opinions on this matter are rather ambiguous.

Given a study conducted by A. Abramson (2021) on the basis of the American Psychological Association, it was found that the concept of empathy, defined as “a sense of awareness of the patient’s feelings and troubles, as well as a view of them from the patient’s point of view”, is only one of several factors that play a key role in a strong psychotherapeutic dialogue. In fact, this confirms the theory of this study about the contradictory role of empathy in psychotherapy. In turn, A. Furnham & A. Rosen (2016), in their study, showed that empathy has negative aspects of its expression. Surprisingly, empathic abilities can be used as a manipulative influence on a person, which also confirms the judgement that empathy is not always acceptable. At the same time, W.K. Fong & A.Y. Bakar (2023) proved in their experiment that a high level of empathy contributes to the development of psycho-emotional illnesses more often than its low manifestation, which also confirms the theoretical findings of this study. In addition, H. Riess (2017) identified in his study the interaction of neural connections that showed an empathic component as one that activates a person’s prosocial behaviour. At the same time, he explained that the level of empathy is based on the genetic aspect of a person, so it can be quite difficult to learn empathy. At the same time, the study by D.M. Folmar & N.S. Jordan (2024) explained the need to close the deficit of people’s empathic skills in order to understand and accept the different values and views of others. The study found correlates that established human empathy as a fundamental psychotherapeutic skill, which, in turn, is almost the highest factor that has an impact on the client’s outcome.

The next set of confirmations of how empathy is felt in human life was the work of O. Matlasevych & I. Kolyazhna (2022), who, in turn, explained that empathy is the ability to understand the inner world of another person and show compassion for them. At the same time, the researchers focused on the fact that empathy is indeed one of the key factors of professional competence for practical psychologists and a factor in the effectiveness of their professional work. In contrast, the researchers outlined that excessive empathic care is a source of risk for the development of psychological (psycho-emotional) burnout. In order to counteract this, it was found that psychologists can usually use 5 forms of empathic response in their work:

understanding, eliciting, exploring, assuming and interpreting the patient’s emotions. Also, according to the results of a study conducted by S. Ren (2024), it was found that the feeling of empathy of one person for another is defined mainly by empathy for negative emotions. It follows that a person who “takes over” the negative emotional feeling of another person is at risk of having their psychological and emotional state deteriorate and become a reactor for the development of psychological dysfunctions. It was also assumed that it is the cognitive costs that directly determine the possibility of choosing empathy. If people are asked to make a choice about sharing the feelings of others, they usually act as if it is not worth the effort.

The results of an experimental study by O. Biletska (2021) show that the empathic abilities of a person in the process of communicating with others play a very important role in identifying a person in society. The scientist considered the problems of trust and empathy, noting that the level of a person’s trust increases with the level of empathy shown to them. In turn, K. Pettit *et al.* (2022), in their work, on improving patients’ perception of doctor’s empathy, define the factors of human empathy. One of these factors is a person’s ability to meta-analyse their own behaviour. The type of thinking of a person, in determining the level of empathy, is also an important correlate, as it is inherent in a person at the genetic level.

In general, the concept of “empathy” has been considered by many psychologists, and from different perspectives (positive and negative). However, to somewhat refute both the meaning of empathy and the ways of measuring it, the following should be noted. In its general quality, empathy cannot be measured using various methods. A person can only know about his or her own consciousness and learn to understand it, while the consciousness of other people is only a hypothesis, assumption, or fantasy. Accordingly, there is no way for a person to be convinced that another person (or persons) has a certain level of empathy, or lack thereof. Having made a systematic review of any contemporary research, such as, for example, the scientific works of A. Furnham & A. Rosen (2016), L. Bru-Luna *et al.* (2021), and M. Fuller *et al.* (2023), it is possible only to assume that there is a high or low, or average (moderate) level of empathy. In general, empathy is not possible without a deep reconstruction of a person. If a counselling psychologist fully understands what is important to another individual, i.e., understands his/her psychotype, what motives were prioritised by this individual, what basic instincts he/she correlates with, then the specialist is really able to understand the patient, which in turn is an element of empathy. The introduction of empathy as acceptance, in turn, allows the development of the skill of empathy. In other words, accepting a person, or people in general, as they are, with their emotions and ways of expressing them, will also be empathy to some extent. On this basis, empathy should be regarded as a relational component of individuals’ communication skills, rather than an individual criterion that determines the level of professionalism of

a future psychologist. Ultimately, empathy cannot be reasonably changed with the help of methods and techniques that guarantee its increase, as noted by the researchers. This confirms the ambiguity of the need for empathy as a key quality of a counselling psychologist, which was introduced by the results of this study.

CONCLUSIONS

This study provides a theoretical justification of the importance of empathy in human professional activity in terms of its perception, origin, levels of its manifestation and the consequences it provokes. Based on a systematic review of the indicators used for this study, the author has formed specific conclusions regarding the definition of empathy as a criterion of professionalism. According to the literature review, there are many contradictions on the importance of empathy both in the field of psychological counselling and in everyday life. A high level of empathy, in general, in the communicative sphere of activity, including psychology, has a positive aspect, as it contributes to the formation and harmonisation of relationships between people of different psychological types, by increasing the level of compassion and understanding, which stimulates the development of communication skills. In contrast, the length of social interaction provokes an increase in the likelihood of a person's psycho-emotional state deteriorating. Moreover, the presence of a high level of empathy increases the likelihood of developing depression and anxiety in people who have frequent social contact with others. On the contrary, the level of empathy tends to decrease with the growth of depression.

In addition to this, the criteria of verbal and non-verbal behaviour of people in the process of communicative social interaction, which can be perceived as obstacles to the perception of empathy, as well as those that were determined by the enhancing effect on empathic influence, were formed. These criteria were considered to include the most dangerous in terms of reducing empathy, namely depression, psychosomatics, obsessive-compulsive behavioural disorders, and excessive anxiety or fantasy. Elements that contributed to the enhancement, i.e., development of a person's empathic abilities included facial expressions,

gestures, body posture, and specific questioning aimed at the general opinion of the patient, rather than focusing on one's own judgements and beliefs.

From the point of view of neurophysiology, several neural connections in the brain are responsible for empathy, which are signals of innate human characteristics. The level of empathy depends on a person's psychotype, i.e., the way they think. Accordingly, a high level of empathy provokes prosocial behaviour, which is expressed in selfless positive actions aimed at a person in distress. At the same time, a low level of empathy generates antisocial behaviour, which is characterised by an indifferent attitude to the experiences of another person. Instead, a high level of empathy allows a person to reconstruct their behaviour by refuting it or encouraging them to improve their communication skills. Focusing on the importance of empathy in the communicative process of psychology, conclusions have been drawn about the bias towards other criteria of psychological competence that form the level of a psychologist's qualification and ensure his/her professionalism. Empathy can be identified as one of the criteria for effective counselling, but it cannot be a decisive component of the psychologist's professionalism and competence as a specialist.

Too many contradictions on this topic did not give a complete definition of the importance of empathy as a criterion for professional growth and competence of a counselling psychologist, which became a limitation for this study. Therefore, in order to counteract the contradictions related to the definition of empathy as a factor in the professionalism of psychologists, further research should use other aspects that form the professional competence of a psychologist, psychotherapist, etc. In general, the results of this study can be manifested as an increase in the empathic behaviour of psychologists, taking into account certain criteria for assessing empathy and the points of view of scientists.

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CONFLICT OF INTEREST

None.

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Емпатія як професійна якість психолога-консультанта

Анотація. Метою дослідження було виявлення ролі емпатії у професійній діяльності людини та у її житті в цілому, а також, дослідження впливу емпатії на психічний стан індивіда. Це дослідження формувалося на основі систематичного огляду матеріалів, що виявляли кореляти впливу емпатичного рівня на психоемоційний стан людини, а також пояснювали роль емпатії для людини, з протилежних аспектів її вивчення. Результати дослідження базувалися на рівнях порівняльних показників, що демонстрували вибірки людей у комунікативних сферах діяльності, на основі яких були зроблені відповідні висновки, щодо ролі емпатії у професіях консультування та контактування з людьми. Відповідні результати показали, що роль емпатії у житті та діяльності людей, є важливим критерієм, проте у деяких випадках вона визначає негативний аспект дії. Технологія вираження емпатії базувалася на декількох критеріях в залежності від її виду. Когнітивна емпатія, афективна (емоційна) емпатія та емпатична опіка являли відмінні між собою аспекти вираження, коригуючи різні моменти в ході комунікативної дії. Зокрема, фактори, що в негативному сенсі впливали на проявлення та розвиток емпатичних здібностей респондентів, являли собою переважно відсутність належного досвіду, освіти, розуміння, скутість або надмірне зосередження на власній позиції. Поруч з тим було зрозуміло, що рівень емпатії залежить від способу мислення індивіда та є стимулом до просоціальної поведінки, які натомість, є вродженими, еволюційними характеристиками людини. Згідно отриманих показників, високий показник емпатії позитивно регулює комунікативні відносини у соціумі, разом із тим, вищий показник емпатичного рівня сприяє розвитку депресій, психосоматичних розладів, підвищує тривожність та стимулює obsesивно-компульсивну поведінку. Проте, варто зазначити, що питання значення ролі емпатії для психолога є суперечним та вимагає більшої уваги для детального окреслення її сутності

Ключові слова: комунікація; реконструкція; метасвідомість; усвідомлення сенсу дій; просоціальна поведінка

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