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Informational heuristics as a mechanism for ensuring success in the system of student research activities

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Abstract. Modern transformational processes driven by the rapid development of advanced technologies increase the demands on the quality of human capital, a crucial component of which is research activity. The higher education system faces the challenge not only of knowledge transmission but also of developing key research skills and abilities in students. Informational heuristics, which optimise the processes of searching, processing, and interpreting scientific information, act as a tool for enhancing the effectiveness of student research. Its application is essential to meeting the current demands of the global educational environment. The aim of this article was to present the content of the informational heuristic mechanism in its various manifestations as a guarantee for ensuring success in the formation of research skills among students of pedagogical higher education institutions (HEIs), using the example of teaching the educational component "Fundamentals of Scientific Research and Academic Writing". The research employed the methods of analysis and synthesis, which made it possible to generalise knowledge on the issue: by analysing the types and forms of student research activities in pedagogical HEIs in the specialty 015 "Professional Education (by Specialisations)", the compliance of such activities with legislative norms was established; by examining the process of acquiring research skills by students of pedagogical education in accordance with legal norms through the use of informational heuristic methods, their most significant application in the teaching of the educational component "Fundamentals of Scientific Research and Academic Writing" was identified; by analysing the peculiarities of productive formation of research skills in the educational process, the role of library heuristics in this process and in the development

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of text analysis skills was highlighted. The results of the study can be implemented in the educational process to optimise the teaching of courses on the fundamentals of scientific research, as well as to improve the effectiveness of academic writing instruction

Keywords: information; search methods; human capital; digital skills; text analysis; research skills of students; ability to work with selected information

Introduction

The rapidly transforming world, driven by the digitalisation of civilisational progress, demands profound changes in educational processes across all countries without exception. Contemporary scholars affirm a gradual transition towards a knowledge-based society, where information becomes the resource that forms human capital, the driving force behind global transformational processes. Information, its conscious processing followed by concrete technological application, is an integral part of the scientific process. Thus, in educational institutions focused on pedagogical training, it is particularly relevant for academic and pedagogical staff to direct their efforts toward developing students' skills in searching for and processing information, ensuring the acquisition of knowledge that becomes the primary productive resource, a source of scientific and creative activity, and a priority socio-cultural force. The knowledge and skills acquired by young teachers will inevitably be transferred to the educational processes of secondary schools, assisting in the formation of the scientific potential of the younger generation. Therefore, the issue of developing research skills in the educational process of pedagogical higher education institutions (HEIs), where informational heuristics play a significant role, is not only relevant but a task of utmost importance.

In his study on the transformation of educational colleges into higher education institutions in Myanmar, M.T. Kyaw (2022) specifically highlighted political (state) encouragement for teachers to engage in research activities. According to M.T. Kyaw (2022), state-driven motivation for research activity contributes to the advancement of the education system and enhances competitiveness. The scholar also draws attention to the role of internal motivation and the professional growth of teachers through research activities. In his publications, M.T. Kyaw (2022) emphasised the mechanisms of research activities among pedagogical staff, with particular attention to the autonomy of the research process.

In their research, A.-S. Grub *et al.* (2022) emphasised the importance of knowledge gained in HEIs for the professional development of future teachers and their ability to effectively manage the classroom using mechanisms such as "noticing" and "reasoning". These mechanisms, in the authors' view, are well-formed and developed from the first year of study through research activities. "Noticing" is ensured through the educational process of instructional work with information sources, while "reasoning", as a component of knowledge-based ability, becomes a part of the educational process driven by internal motivation for professional expertise. "Reasoning" serves as a stimulus for deepening knowledge, which primarily occurs due to the scientific component of the educational process.

N. Brouwer *et al.* (2022) argued for the continuity of student-centered learning in the university and its subsequent impact on pedagogical activities, accompanied by continuous professional development through scientific work, the application of new teaching methods, and participation in various courses, seminars, and training sessions. All of this is in demand even at the HEI level, with student-centered learning fostering deep competence, which manifests through competence-based organisation of learning during university years and through self-learning during the teaching profession. The authors also pointed out the need for students to participate in university research programmes, where the culture of scientific communication and work influences the formation of the student's contextual personal thinking. The teaching staff increasingly invests their time in students to achieve scientific and professional-pedagogical outcomes.

Interesting is the proposal by N. Brouwer *et al.* (2022) regarding the creation of individual, personalised educational programmes in higher education institutions (HEIs), where both the teaching system and the form of practice are tailored to the individual. According to the authors, such a personalised approach to the educational process is effective. Scientific research requires knowledge and skills in writing academic texts; therefore, attention is drawn to the recommendations by W. Zhou *et al.* (2023) concerning the use of syntactically complex sentences in the introductions of research articles. The authors investigated the relationship between linguistic features and their rhetorical functions in academic writing and provide guidance for young researchers on using syntactically complex sentences when writing the introduction to research articles. Studying these recommendations is highly relevant when exploring the educational component "Fundamentals of Scientific Research and Academic Writing", as they help form an understanding of the connection between linguistic features and their rhetorical functions in academic writing. In practical terms, they also assist in developing the skills

necessary to use syntactically complex sentences when writing academic papers.

H. Løje *et al.* (2017) focused on enhancing students' innovative interdisciplinary competencies. Although the authors primarily concentrated on the training of engineering students, the issues they examined are also relevant to the general training of pedagogical higher education students in a rapidly changing globalised world. The competence of HEI graduates significantly benefits from the acquired research skills and the development of innovative abilities. The acquisition of interdisciplinary competencies by students in pedagogical HEIs provides the ability to transfer knowledge, skills, and abilities from one field of science and professional activity to another, thus ensuring increased competitiveness in the job market. In preparing future professional education teachers (by specialisations) in pedagogical HEIs, interdisciplinary competence enables the formation of a symbiosis of knowledge, the synthesis of skills, and the enrichment of abilities.

The application of various forms of informational heuristics in the development of research skills among students of pedagogical higher education and the role of the educational component "Fundamentals of Scientific Research and Academic Writing" in this process constitutes the primary goal of this article. The task of this work was to analyse the most effective methods of informational heuristics in the process of forming research skills among students of pedagogical higher education.

During the research, various methods were employed for a thorough analysis and study of the issues related to research training in pedagogical education. The method of analysis allowed for a detailed examination of existing sources of information, such as academic articles, monographs, and studies on research training. This method helped identify key aspects and issues that require further study, as well as understand the current state and trends in this field. Synthesising information from various sources allowed for the integration of different approaches and concepts, creating a cohesive picture. Synthesis helped integrate the results of previous studies and identify general trends and patterns, contributing to the formulation of generalised conclusions and recommendations. The use of analogy allowed for comparisons of the studied aspects with similar processes in other fields or within the context of different educational systems, which helped uncover effective practices and solutions that could be adapted to improve research training in educational institutions. The comprehensive application of these methods not only facilitated the systematisation of existing data but also led to the formulation of new approaches and recommendations for enhancing the effectiveness of research training. The research results serve as a foundation for further scientific exploration in this area and open new perspectives for improving educational practices.

Heuristics and research training

An attempt to generalise scholars' views on the interpretation of the term "heuristics" was made by O.M. Zbanatska (2020). She argued that heuristics, as a science, is not yet fully formed. Its subject and methods are deeply integrated with philosophy, psychology, and the physiology of higher nervous activity, as well as many other scientific disciplines. This research expands the understanding of the boundaries and possibilities of heuristics, while also opening new perspectives for its further development and application in various scientific and practical contexts.

The importance of the research by O.I. Nefedchenko (2023) lies in its exploration of the theoretical and technological foundations of heuristic education, providing a clear understanding of its development both in Ukrainian and international pedagogy. The monograph substantiates the author's concept of periodisation in the development of heuristic education, allowing for a deeper understanding of the evolution of methods and approaches in this field. Furthermore, the study summarises the results of theoretical and experimental research conducted by academic schools and individual scientists, contributing to the further development and improvement of heuristic education.

The issue of creative thinking as a feature of modern heuristics, which is shaped by innovative cognitive approaches in the development of a "knowledge society" and the active integration into the informational world that immerses individuals in a new socio-cultural environment, and fosters the rethinking of the value of scientific knowledge for intellectual culture, was the focus of A.V. Sakun (2015) monograph. The correlations between the concepts of "bibliographic heuristics" and "bibliographic search", as well as the delineation of the communication environment of bibliographic heuristics, were discussed in the works of O. Zbanatska (2020).

The practical guide by the staff of the V.O. Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine, authored by O.V. Hryhorevska *et al.* (2022), focuses on the formation of information resources in higher education institutions' libraries and the provision of access to them. These studies contribute to a deeper understanding and improvement of tools supporting scientific and educational processes and offer new perspectives and approaches for the development of key aspects of modern heuristics and informational resources. Zh.O. Kormosh *et al.* (2020) developed a manual that includes information aimed at developing students' ability to search for and analyse multi-source information. The authors provided practical recommendations and methods that contribute to the development of critical analysis skills and the effective use of library and digital resources.

Yu.I. Mingalova (2018; 2021) dedicated considerable attention in her publications to the issue of

students' research work during classes on the educational component "Fundamentals of Scientific Research". An interesting study by M.G. Drushlyak *et al.* (2022) focused on media education, students' media literacy, and the role of information self-learning. The authors conducted an analysis of the use of informational resources and identified their potential impact on the development of media literacy among young people.

From a methodological perspective, the educational manual offered by the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", is noteworthy (Sharpan, 2023). This manual addresses an important task-enhancing rational creative thinking among students and helping them gain experience in transitioning from a student-researcher to a scientist. The material of the manual fosters an understanding of the methodology of scientific creativity.

The methodological component of scientific research is also presented in the manual "Fundamentals of scientific research and the theory of experiment", compiled by Yu.B. Kapatsila *et al.* (2023). The materials of this manual not only focus on uncovering the essence of the principles and methods of scientific research but also thoroughly explore the sequence of conducting experimental research, ensuring theoretical modeling, and performing data analysis. The authors emphasised different types of research and offered various approaches to conducting experiments for study and use.

Having analysed a wide range of studies conducted by both foreign and domestic scholars, the following key aspects can be identified:

- The multidisciplinary nature of heuristics;
- Informational heuristics as a mechanism for searching knowledge sources aimed at shaping the scientific worldview and creative activity of future builders of the knowledge society;
- Educational heuristics as a method for transitioning from an inducive-elicitative knowledge acquisition mechanism to intuitive heuristics and heuristic programming;
- The role of higher education institutions (HEIs) in shaping knowledge on the diversity of independent information search methods;
- The importance of self-learning in acquiring skills for utilising informational resources;
- As a result, the formation of creative thinking and the development of research skills emerge.

The described scientific contributions have become a significant component in forming a holistic understanding of the role of information, informational heuristics, and research skills in the professional development of "new" pedagogical staff. It is on the knowledge potential of these individuals that the preparation of the "builders" of the globalised society of the 21st century will rely. Therefore, the processes characterised in this study represent a substantial step toward forming effective "builders" of the information and knowledge-based society.

The role of transformational processes in the development of education and science in the context of globalisation

Transformational global processes create challenges for the modern development of the globalised economy, giving rise to interstate and civilisational confrontations, manifesting through societal tensions, regional conflicts, and local wars. These processes set a new vector for global development, where education and science play the role of a foundation for stabilisation: education as the basis for creating the intellectual resources of states, and science as the technical and technological guide for economic changes, along with the corresponding dynamic political framework that operates for the benefit of humanity, welfare, and well-being (Hryhorevska *et al.*, 2022).

Education is becoming a social institution tasked with the mission of shaping the future of a human-centered society. Higher education is gradually transitioning towards the active involvement of students in fundamental and applied scientific research, which is conducted by academic and pedagogical staff in collaboration with potential employers, research institutes, and business centers. Therefore, from the very first years of study at higher education institutions (HEIs), students must acquire skills in conducting research, as it is the foundation of all sciences. They must realise their creative potential and apply the newly acquired knowledge in the form of scientific information to subsequently create technical, technological, or social innovations. For students, research work provides an opportunity to acquire or improve their knowledge based on the experiences of others, enhancing their strengths and correcting their weaknesses (Morgun *et al.*, 2021).

An essential mechanism that fosters the development of research skills and the formation of innovative knowledge is educational heuristics. As an educational method, heuristics ensures a gradual transition from organisational-search mechanisms of cognitive activity to the development of independent thinking and creative activity, i.e., "intuitive heuristics" (related to associative memory and the brain's ability to provide quick thinking and generate ideas based on perception, memory, and emotional mechanisms) and "heuristic programming" (which can be applied for the precise description of specific processes).

Pedagogical HEIs build students' research work based on the National Doctrine of Education Development, which clearly states the necessity of organically combining education and science, forming a modern worldview, and developing creative abilities and skills for independent scientific exploration, self-education, and personal self-realisation. It emphasises

the preparation of qualified professionals capable of creative work, professional development, mastering and implementing knowledge-intensive and information technologies, and competing successfully in the labor market (Decree of the President of Ukraine No. 347/2002, 2002).

The establishment of research activities for students in pedagogical higher educational institutions is also based on Order of the Cabinet of Ministers of Ukraine No. 286-r (2022). This document states that:

- The reform of the educational process in higher education is expected to result in "the creation of intellectual and innovative products and services by higher education institutions, which are implemented and provided in the real sector of the economy";
- International educational and scientific cooperation is deemed relevant and necessary, where mechanisms for "integrating scientific and scientific-pedagogical staff into the global space" may be employed;
- A level of international scientific cooperation is anticipated such that by 2032, "the share of full-time scientific-pedagogical and scientific staff who will have 25% of scientific publications in specialised scientific publications of category "A";
- Higher education institutions are required to ensure "the creation of conditions for the participation of higher education seekers in scientific research, the initiation and implementation of innovative projects";
- The state stimulates "the support of cooperation between higher education institutions and research institutions, participation in the implementation of international scientific projects and programmes, primarily of the European Union";
- The third stage of implementing the Strategy for the Development of Higher Education in Ukraine is characterised by "the expansion of links between education, science, and business, and integration into the global educational and scientific space…".

The implementation of the norms specified in the above regulatory documents aims to create favourable conditions in pedagogical higher educational institutions for the development of creative thinking, the formation of a scientific worldview and erudition, and the expansion of research capabilities. Overall, this contributes to the quality training of future educators who are prepared, skilled, and capable of engaging in not only teaching but also scientific and creative activities.

Informational heuristics in research activities: Theory, practice, and educational aspects

The foundation of scientific activity is the mechanism of information search as a source for analysis, a basis for critical reflection on processes, and a stimulus for innovative actions. The process of searching for information that becomes the "starting point" in the system of scientific research can be categorised as "informational heuristics". Delving into the meaning of the term "informational heuristics", it is important to highlight its multifaceted and ambiguous interpretations. One can agree with Z.V. Hipters (2008), who suggested that the term "heuristics" is associated with productive creative thinking aimed at resolving contradictions through the intuitive mechanisms of the human psyche.

Aiming to create a model for resolving contradictions and reaching a new level – an innovation – heuristics, as a process, is based on an informational component, which ensures either diligent work, a brilliant insight, or a complex process of creative thinking. Being a complex concept, informational heuristics is a combination of philosophical, psychological, cybernetic, and scientometric knowledge aimed at solving tasks for which personal experience is insufficient, and where the conditions surrounding the problem do not suggest a solution. A new activity strategy (the research process) includes a significant mechanism (informational heuristics), where knowledge of information theory, creative thinking skills, and intellectual capabilities are essential. Providing the opportunity to develop a person's abilities for creative intellectual activity is one of the main tasks of modern higher education institutions (HEIs) in Ukraine.

In the information age, the development of cybernetics enables the creation of heuristic programming, which is applied in situations where a person can evaluate the results of a process but cannot describe it precisely. For this purpose, various heuristic programmes are created to model the process of solving specific tasks. Heuristic programmes have limited search capabilities due to technical limitations, such as the precision of execution and description, while "human heuristic abilities in some cases are still not subject to formalisation" (Dictionary of the Ukrainian language, 2013). Selective search is used, a motivational mechanism for action is activated, the psychology of thinking is engaged, and human intellect plays a role. In modern conditions, the skillful combination of human abilities and technological support is appropriate. The preparation of individuals to competently use technological resources is entrusted to various levels of educational processes.

In pedagogical HEIs, the following types of research activities for students are distinguished: academic research according to curricula and research within the framework of scientific work conducted by the faculty of departments. The result of students' research work according to curricula includes activities related to solving problem-based tasks during seminars, laboratory, or practical classes; conducting independent research work; carrying out individual pedagogical or industrial tasks during internships, as pedagogical HEIs prepare specialists in professional education by specialisation; writing essays on topics for each educational component; and preparing for the defense of term papers and qualification projects. Through this direction of

academic research, which becomes more complex with each academic year and increases in depth of requirements, the process of scientific cognition is ensured, leading to the growth of self-realisation and pedagogical-scientific self-affirmation (Luhovyi *et al*., 2021).

The process of scientific formation for future vocational education teachers is essential, as the result of the educational process in pedagogical higher education institutions (HEIs) should not only be the preparation of a qualified professional teacher but also a potential innovator in the industrial-professional sphere. Such an individual should be capable of transferring their skills, expertise, and knowledge to others and, through their creative activity, fostering the creative development of graduates from vocational and technical education institutions. The ability to work in a research-oriented mode from their time in pedagogical HEIs will enable young vocational education teachers to bring elements of scientific-practical and research-experimental activities into vocational and technical education. Every research paper or term project becomes a step in the professional development of the future vocational education teacher, both as a teacher and as a researcher.

Research activities of students outside the formal educational process contribute further to solidifying the high qualifications of future vocational education teachers. These research activities include subject-specific scientific research, participation in departmental work on state-funded or contract-based research topics, and conducting studies within the framework of collaboration between HEIs and vocational and technical education institutions. Particularly noteworthy is the involvement of students in student research centers and lecture associations, where the outcomes include organising student conferences, roundtables, and debates on problematic issues; setting up lecture series on research topics; and publishing a collection of student research papers (every semester). This activity fully complies with the norms outlined in the National Doctrine of Education Development (Decree of the President of Ukraine No. 347/2002, 2002) and the Strategy for the Development of Higher Education in Ukraine for 2022-2032 (Order of the Cabinet of Ministers of Ukraine No. 286-r, 2022). These documents confirm the unwavering direction of Ukrainian education towards the formation of human capital, where significant components are not only the ability to engage in innovative activities but also the capacity to defend one's creative achievements in any scientific discussion through heuristic dialogue.

Thus, one can speak of the importance of heuristic progressive learning forms in shaping a new societal communication system that meets the demands of the information society of the 21st century.

The foundation of research work for students is the skills embedded in the educational component of pedagogical higher education programmes – "Fundamentals of Scientific Research and Academic Writing". A fundamental skill in conducting research is the ability to search for and analyse information. Given the vast amounts of available information, it is essential to guide students in searching for relevant information, teaching them to properly evaluate, categorise, and rank the collected data. To achieve this, instructors offer a system for evaluating information that includes the following criteria: the novelty of the information, its reflection of significant contemporary issues, the reliability based on the trustworthiness of the source, the adequacy of the information through an analysis of the degree of hypothesis argumentation, the sufficiency determined by the volume of information needed to support the hypothesis, and the accessibility based on the ease of comprehension, speed of retrieval, and potential for dissemination. Through this process, students develop the "heuristic potential of research", where cognitive tools and methods are combined to identify and solve the problem of selecting information for further scientific research.

Authors believe that even during the transition to an information society, students should be encouraged to use various types of information carriers – printed, electronic, audio, video; traditional and modern sources of information – libraries, websites of research institutions, professional publications, webinars, conferences, etc. It is clear that students increasingly rely on modern information sources (which offer speed, flexibility, and access to foreign resources, among other advantages). Therefore, it is the responsibility of HEI instructors to teach students to verify information from internet sources and to focus on peer-reviewed information from websites of academic institutions, professional electronic publications, and library websites.

In lecture sessions for the "Fundamentals of Scientific Research and Academic Writing" course, the use of informational systems such as Google Scholar, Google Book Search, World Digital Library, Open Library, and others is recommended. The importance of students' own informational resources is also highlighted, which not only allow the sharing of certain information but also foster the exchange of ideas and opinions (these platforms can serve as a basis for online surveys related to research activities). Additionally, students are encouraged to engage in collective work using Web 2.0 technologies (Blogger, Digg, Wetpaint, Wiki, Google Docs, etc.), which facilitate the collaborative creation of informational resources on a particular research problem through the joint interaction of multiple users (from different courses, faculties, or even different universities). Such collective work among students with a shared interest in a specific problem allows for the rapid formulation of hypotheses, a more comprehensive analysis of information, and the identification of models for solving the research problem.

However, the primary focus is on the individual preparation of students for research work: training

them in research methods and technologies, developing a research programme, familiarising them with the reporting forms for each stage of research, and guiding them through the process of presenting and defending their research results. Given the extensive global information resources available in the informational network, the authors' courses in "Fundamentals of Scientific Research and Academic Writing" teach students not only how to search for information but also how to use it effectively. By developing information search skills, students are taught to properly plan their search strategies and consciously create criteria for information selection; to accurately choose keywords while forming a search image for a document; and to focus on the thoughtful and holistic understanding of information, emphasising the importance of correct classification.

Through both collective and individual preparation for research activities, students are guided in refining their cognitive processes, aiding intellectual localisation, developing research skills, and reinforcing the ability to select appropriate research methods – these competencies are essential components of modern heuristic learning. The libraries of higher education institutions now ensure high-quality information selection by establishing automated library information systems (ALIS), retro-converting library collections, and creating electronic catalogues through digital technologies. Within the scope of the academic module "Fundamentals of Research and Academic Writing", the focus lies on teaching students effective research strategies, understood as a logical process grounded in source knowledge, and recording information that can serve as a foundation for future research. In other words, the course enables the use of bibliographic heuristics, defined by O.M. Zbanatska (2020) as the "basis of bibliographic search" – a methodology that encompasses search rules, output criteria, and the collaboration system between the researcher and the information retrieval system.

Knowledge of bibliographic source studies is crucial for student research, along with the ability to identify key characteristics for finding relevant bibliographic material and maintaining a consistent awareness of connections between the targeted source and academic or public references. These skills aim to make research swift and effective, instilling in students the understanding that only through dialectical-logical retrieval methods can success be achieved at one of the initial stages of scientific inquiry – identifying the search profile of a document as an information source. Upon forming the search profile, document retrieval can commence, facilitated by the ALIS currently in use across Ukrainian academic libraries.

Through sequential academic introduction and practical methodologies, students are trained to work with information products and the digital services offered by both university and other libraries. Class sessions, followed by internship experiences, equip students with skills in using digital services and products, such as reference requests, document access from collections, and electronic document delivery; bibliographic information through indexes, databases, and reading lists; as well as factographic databases, reference materials, and dossiers. Given the increasing presence of online information products, working with library systems and various documents imparts skills beneficial for research, such as bibliographic, document, and factographic search methods.

Bibliographic search involves seeking document-related information, document search locates the document itself, and factographic search examines the document's content and information. O.M. Zbanatska (2019) suggests considering these processes as forming fields of study – bibliographic heuristics, document heuristics, and document-information heuristics (factographic heuristics).

Student attention is also directed toward library services that include text analysis (factographic, conceptographic, analytical): computer research, factographic dossiers, analytical reviews, digests, etc., which are essential in research activities. In seminars on "Fundamentals of Research and Academic Writing", text analysis skills are practiced and refined during library internships, assisting students in applying these skills effectively to their own research activities.

To acquire more extensive information during research activities, students are encouraged to keep track of virtual book exhibitions held by libraries. These exhibitions focus readers on collections within specific subject areas, with books or documents that can subsequently be ordered for review (via interlibrary loan or electronic document delivery services). Information presented in lectures on international interlibrary loans and document delivery services, such as The British Library Document Supply Centre (BLDSC), enables students, when necessary, to obtain this information for their own research purposes. Libraries in Ukrainian higher education institutions support such collaboration with international library networks and funds by preparing relevant permits and establishing electronic communication systems. Students make extensive use of the interlibrary loan system, becoming increasingly convinced of the power of Internet capabilities and digital transformations within the field of library services (Lobuzina, 2012).

In the context of the study, developing students' skills for effective online work, including information search strategies and critical information assessment, is essential. It is important to teach them library and informational heuristics to promote an understanding of various information resources, such as educational, scientific, regulatory, reference, and electronic libraries. Additionally, while performing independent tasks, students should become familiar with intellectual

property norms related to accessing electronic resources (Serhiyenko *et al.*, 2022).

Another important source of information for students' academic activities is the use of their university's electronic archives (repositories). Having gained worldwide recognition in the early 21st century as accumulators, systematisers, and disseminators of the digital scientific outputs of institutional staff and digitised documents of the legal entity itself, university repositories have transformed into indicators of institutional quality, conferring appropriate status and public significance.

Repositories guarantee open access to the research conducted within the university. This information is utilised by university students in their research activities. Students can observe the scientific achievements of the university's academic staff, track citation metrics of departmental researchers, access electronic versions of instructors' academic work, and consult directly with authors if they encounter difficulties in comprehending the researcher's ideas. This direct scientific communication between researcher and student on academic topics yields positive results for both parties, particularly for students as young researchers. Access to the repository fosters students' reading and research initiatives, expands their academic opportunities, and enhances scientific communication across various levels.

Conclusions

The conducted research underscores the critical role of informational heuristics in the contemporary scientific process, which integrates philosophical, psychological, and cybernetic aspects to enhance information search and analysis. This becomes particularly significant in the context of the rapid advancement of information and computer technologies, where the use of modern digital tools alongside traditional sources enables a comprehensive approach to solving complex problems. Informational heuristics, with its capacity to foster creative thinking and the discovery of new problem-solving models, is not a standalone science, yet it holds considerable potential for further in-depth research within a range of fundamental sciences.

Heuristics, including its various forms (informational, documentary, bibliographic, and archival), is linked to intellectual activity that incorporates elements of intuition and novelty. This fosters human innovation and is critically important for the formation of human capital in an era of transformations. Heuristic learning, based on information processing and the reinforcement of basic and specialised knowledge, prepares students for research activities. The complexity of this activity often lies in the search, analysis, and systematisation of information – essential skills developed in courses such as "Fundamentals of Research and Academic Writing".

The individual and collective preparation of students for research activities, particularly in the field of informational heuristics, is a key component of their professional competency. In the modern information society, continuous improvement of information processing methods is crucial for enhancing the quality of both scientific work and education. Automated library information systems also play an important role in scientific inquiry; thus, students must learn to effectively utilise both traditional and digital resources to uphold high standards in research work. Heuristic learning and informational heuristics, in general, have become primary mechanisms in the development of young researchers, which is essential for building an information society.

Prospective areas for further research include studying the impact of new information technologies on the efficiency of information search and analysis. Another important aspect is assessing the practical significance of different approaches to teaching heuristic skills across various professional fields.

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Conflict of Interest

None.

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Інформаційна евристика як механізм забезпечення успіху в системі наукових досліджень студентів

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■ **Анотація.** Сучасні трансформаційні процеси, зумовлені швидким розвитком новітніх технологій, посилюють вимоги до якості людського капіталу, важливою складовою якої є науково-дослідна діяльність. Перед системою вищої освіти постає завдання не лише передачі знань, а й формування ключових дослідницьких навичок та вмінь у здобувачів. Інформаційна евристика, яка забезпечує оптимізацію процесів пошуку, обробки та інтерпретації наукової інформації, виступає інструментом для підвищення ефективності наукових досліджень студентів. Її застосування є необхідним для відповідності сучасним вимогам глобального освітнього середовища. Метою статті була репрезентація змістового наповнення механізму інформаційної евристики в різноманітних її проявах як гарантії забезпечення успіху у формуванні навичок науково-дослідницької діяльності здобувачів освіти педагогічних закладів вищої освіти (ЗВО), на прикладі досвіду викладання освітнього компоненту «Основи наукових досліджень та академічного письма». У ході дослідження заявленої проблеми було використано метод аналізу та синтезу, що забезпечило можливість узагальнити знання з проблематики: проаналізувавши види та форми науково-дослідницької діяльності студентства в педагогічних ЗВО за спеціальностями 015 «Професійна освіта (за спеціалізаціями), встановити відповідність здійснюваної такої діяльності нормам законодавства; розглянувши, відповідно до правових норм, процес набуття навичок науково-дослідницької діяльності здобувачами педагогічної освіти шляхом використання методів інформаційної евристики, визначити їх найбільше представлення в процесі викладання освітнього компоненту «Основи наукових досліджень та академічного письма»; проаналізувавши особливості продуктивного формування навичок науково-дослідницької діяльності в навчальному процесі, вказати на роль бібліотечної евристики в даному процесі та в формуванні навичок аналізу текстів. Результати дослідження можуть бути впроваджені в освітній процес для оптимізації викладання курсів з основ наукових досліджень, а також для підвищення ефективності викладання академічного письма

■ **Ключові слова:** інформація; методи пошуку; людський капітал; цифрові вміння; аналіз текстів; науково-дослідницькі навички здобувачів освіти; вміння працювати з відібраною інформацією