

DIAGNOSTICS OF THE DEVELOPMENT OF INFORMATION AND DIGITAL COMPETENCE OF FUTURE OFFICERS

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ABSTRACT

Formulation of the problem. Today the problem of developing information and digital competence (IDC) of future officers in the context of non-formal education and the problem of designing a diagnostic apparatus to measure such development is relevant. The paper aims to develop a diagnostic apparatus (criteria and indicators) to measure the development of information and digital competence of future officers

Methods. To achieve this goal, we used the analysis and generalization of scientific sources, structural and logical analysis to identify and substantiate the indicators of the development of the IDC of future officers, as well as content analysis and comparative analysis to characterize the levels of development of the IDC of future officers.

Results. To assess the levels of development of the IDC of future officers, the criteria (motivational and value, cognitive and activity) and the relevant indicators (the presence of motives, value attitudes for self-development, knowledge about IT & DT in general and in the industry, the ability to use DT and IT to solve professional problems) have been determined. The qualitative assessment of the indicators made it possible to characterize the levels of development of future officers' IDC. Each level (low, medium, and high) reflects a different degree of IDC development, and, accordingly, a different degree of development of motives, knowledge, and skills to use IT and DT in professional activities. A low level may be sufficient for basic tasks, but medium and high levels are critical for managing complex operations and adapting to the performance of professional duties.

Conclusions. This diagnostic apparatus has been developed, and levels of development of future officers' information and digital competence have determined the ability to use modern technologies to perform official duties effectively. With the help of the diagnostic apparatus, it becomes possible to test the effectiveness of pedagogical models of future officers' IDC development.

KEYWORDS: *information and digital competence; development of the IDC; future officers; diagnostic apparatus; profession activity; education.*

ДІАГНОСТИКА РОЗВИТКУ ІНФОРМАЦІЙНО-ЦИФРОВОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ ОФІЦЕРІВ

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АНОТАЦІЯ

Постановка проблеми. На сьогодні актуальною є проблема розвитку інформаційно-цифрової компетентності (ІЦК) майбутніх офіцерів в умовах неформальної освіти та проблема розробки діагностичного апарату для вимірювання такого розвитку. Мета статті – розробити діагностичний апарат (критерії та показники) для вимірювання рівня розвитку інформаційно-цифрової компетентності майбутніх офіцерів.

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Методи. Для досягнення поставленої мети використано аналіз та узагальнення наукових джерел, структурно-логічний аналіз для визначення та обґрунтування показників сформованості ІЦК майбутніх офіцерів, а також контент-аналіз та порівняльний аналіз для характеристики рівнів сформованості ІЦК майбутніх офіцерів.

Результати. Для оцінки рівнів сформованості ІЦК майбутніх офіцерів визначено критерії (мотиваційно-ціннісний, пізнавальний, діяльнісний) та відповідні показники (наявність мотивів, ціннісного ставлення до саморозвитку, знань про ІТ та ЦТ загалом і в галузі, вміння використовувати ЦТ та ІТ для вирішення професійних завдань). Критерії та показники дали підґрунтя для якісної характеристики рівнів розвитку ІЦК майбутніх офіцерів. На кожному рівні дано відповідну характеристику ступеня розвитку ІЦК, і, відповідно, ступеня сформованості/ розвитку мотивів, ціннісних орієнтацій знань та вмінь використовувати ІТ та ЦТ у професійній діяльності. Низький рівень може бути достатнім для виконання базових завдань, але середній та високий рівні є важливими для управління складними операціями та адаптації до виконання професійних обов'язків.

Висновки. Розроблений діагностичний апарат, а також рівні розвитку інформаційно-цифрової компетентності майбутніх офіцерів разом уможливають оцінку здатності ефективно використовувати сучасні технології для виконання професійної діяльності. За допомогою діагностичного апарату стає можливою перевірка ефективності педагогічних моделей розвитку ІЦК майбутніх офіцерів.

КЛЮЧОВІ СЛОВА: інформаційно-цифрова компетентність; розвиток ІЦК; майбутні морські офіцери; діагностичний апарат; професійна діяльність; освіта.

INTRODUCTION

Statement of the problem. Traditional approaches to teaching tend to prioritize theoretical knowledge over practical application, potentially leading to a gap between what is taught and the realities of practice. In addition, traditional training may not fully consider the rapid development of technology, leaving students poorly prepared to use new information systems already used in their professional activities. Therefore, there is a need for strategic revision of models for training specialists and the development of a diagnostic apparatus to measure their effectiveness. In particular, today the problem of developing information and digital competence (IDC) of future officers in the context of non-formal education and the problem of designing a diagnostic apparatus to measure such development is relevant.

Analysis of current research. The analysis of scientific and pedagogical research shows that the diagnostic apparatus consists of criteria and indicators that allow one to qualitatively and quantitatively characterize the quality levels of the subject of study.

The Encyclopedia of Education for the criterion states "a set of features based on which an assessment of the conditions, process, and result of educational activities corresponding to the set goals is compiled" (Encyclopedia of Education, 2008). In the system of international standards ISO, as indicated (Annenkova, 2011). The definition of the criterion is given as "a measure of reflection of the integrity of the properties of an object, which ensures its existence; methodological tools for education quality management; an ideal sample reflecting the highest, perfect level of the phenomenon under study; a means of selecting or measuring alternatives. An indicator is a specific criterion measure, making it available for observation, accounting, and fixation." Among the requirements for the criteria are objectivity (the ability to assess the features of the object of study), validity (evaluate exactly what the researcher wants to evaluate), neutrality (evaluate only qualities without additional accents), and consistency (cover all important characteristics). In other words, they must assess the features and be neutral to the phenomenon under study, and the set of criteria must cover all essential characteristics.

The problem of choosing criteria is not simple, since it is associated, as noted by Golovan M. S., Yatsenko V. V., "with the non-classicality of any pedagogical phenomenon as an object of research and with the objective imperfection of criterion approaches due to their nature and complexity of creating appropriate evaluation scales" (Golovan & Yatsenko, 2012). According to the analysis of scientific publications (Rudenko et al., 2023a; Rudenko et al., 2023b; Mulesa et al., 2023; Hrona et al., 2024) the set of criteria is not a constant value and may vary according to the field, the purpose and content of the study, and the quality studied. Thus, the study (Torichnyi, 2012) identified two criteria (personal-functional and activity-practical) that characterize the formation of military-special competence of future officers. O. Yevsyukov, based on the results of the study "the structure of professional competence of officers, the need-motivational, operational-activity criteria and the criterion "I-concept" of the formation of this type of competence are distinguished" (Yevsyukov, 2006). In measuring the formation of socio-cultural competence of cadets, N. Moroz singled out five criteria: "motivational, criterion of success, criterion of cognitive activity, country studies and professional" (Moroz, 2007).

The indicator is the characteristic of the criterion that makes it possible to quantify it. If the criteria are considered as the basis for assessing the formation of quality, indicators (indicators) are understood as qualitative and quantitative characteristics of the formation of this quality (degree of formation/development). S. Reshetnyk sees the main characteristics of the "indicator" as specificity and diagnostics (Reshetnik, 2013).

Generalization of the results of scientific research shows that the development of a diagnostic apparatus is an important stage of the study, and therefore, tracking the existing developments, we established the absence of such an apparatus for tracking the development of the IDC of future officers.

The paper aims to develop a diagnostic apparatus (criteria and indicators) to measure the development of information and digital competence of future officers.

MATERIALS AND METHODS

To achieve this goal, we used the analysis and generalization of scientific sources, structural and logical analysis to identify and substantiate the indicators of the development of the IDC of future officers, as well as content analysis and comparative analysis to characterize the levels of development of the IDC of future officers.

RESULTS AND DISCUSSION

Taking into account the approaches to determining the criteria available in academic research, we will substantiate the criteria for the development of the IDC of future officers by the refined interpretation of this quality and remembering that the criteria should be objective, include all essential quality characteristics and measure what is necessary for the study. In other words, the *criteria for developing the IDC of future officers will be understood as a set of characteristics that reflect the specifics of their professional activities in IT&DT, ensuring the solution of their professional tasks*. We have shown that "IDC is an integral socially significant characteristic of a person that combines values and aspirations for professional development in the field of DT application in the industry, IT knowledge (about information and information processes, methods of its processing to solve professional problems in the industry), basic and special skills (to process information in various forms of its receipt, the ability to apply general-purpose digital technologies and specialized software providing professional direction in the industry), which in their totality make it possible to effectively solve the professional tasks of an officer under uncertain initial conditions)" (Semenog et al., 2022). Based on the structural and logical analysis of the concepts of the IDC of various specialists and the interpretation of the "IDC of the future officer" provided, we identified the components of this category: personal, knowledge, and procedure. Considering this structure, the criteria for developing the IDC are motivational-value, cognitive, and activity. Let's dwell on them in more detail.

To characterize the personal component of the IDC of future officers, it is necessary to consider their interest in such development, and the presence of motivation to master knowledge and skills in using IT&DT in professional activities. This involves work aimed at forming a motivational basis for the use of IT, awareness of the role and importance of IT in professional activities, cognitive interest and personal needs for the development of the IDC, a valuable attitude to information, and understanding the importance of self-development in this area.

As L. Maslak notes, "the professional orientation of a future serviceman, among other things, includes motives and value orientations. ... Motives are the motivation of the future officer to professional activity, associated with the attempt to fulfill the set professional tasks" (Maslak, 2010). Therefore, the development of motivation for self-development in the field of IT&DT is associated with the need for effective professional achievements and the level of satisfaction with the results of involving IT in solving professional problems. From the point of view of professional training of officers, this is expressed in the personal need to systematically replenish and expand the relevant professional IT knowledge, knowledge of digital tools in the industry, and the ability to model their IT activities. The level of "formation motivation depends on the degree of activity and the desire to increase the level of professional competence" (Yevsyukov, 2006). Studying the processes of formation of professional competence of future officers, the researcher emphasizes: that "motivation" accompanies the entire process of formation of professional competence, since the very specifics of military service and all actions of a serviceman require an appeal to the personal meaning of what a person's activity is manifested for" [ibid.].

The analysis of scientific literature shows the unanimity of scientists' opinions that the main driving force for the development of the IDC is not only motivation and cognitive motives formed in cadets, which are influenced by the educational environment. The researchers note that cadets' learning process should become a personal and meaningful stage of life. In the educational process, it is important to focus on the professional self-assertion of future officers (Melnychuk, 2018). On the other hand, the personal component of the IDC of future officers determines the value settings and aspirations of future officers for professional development regarding the use of IT and DT in professional activities. Value orientations are parts of the inner part of the personality of a future officer (Slyusarenko, 2015). They are the most important levers for the formation of the personality of a future officer, which is fixed by life experience and the totality of their experiences. They determine the need and interest in obtaining knowledge, skills, and abilities in IT and DT, knowledge about the system of the modern information society; and the need to master methods and actions for search activities and gain experience in search activities.

Thus, the motives and value orientations of a person affect the regulation of cognitive processes, are closely related to the emotional and volitional mechanisms of the human psyche, and regulate his social behavior, and therefore can affect the way of behavior in the professional training. The formation of the personal component qualitatively characterizes the motivational and value criterion, and the quantitative characteristics are given by the indicators "Presence of motives" and "Value attitudes for self-development". A value-based attitude makes it possible to assess the need for the use of IT, determines the cognitive activity of future officers, and the ability to overcome difficulties with using technology and independence. Motivation shows the level of direct interest in performing a task using IT, and the level of awareness of the importance of the data received through the network, indicates the desire to assert oneself, test, and demonstrate one's skills. Therefore, the measure of the development of future officers' component of the IDC is the motivational and value criterion with the indicators "Presence of motives" and "Value attitudes for self-development."

The level of development of the knowledge component of the IDC is increased through the development of general information, digital and media literacy, and mastering the theoretical and methodological foundations of using IT&DT in solving professional problems. In particular, not only a general knowledge of IT and its development is important, but also specialized knowledge of modern geo-inform- systems (GPS, ECDIS (Electronic Chart Display and Information System), information from which officers should be able to interpret; knowledge of cybersecurity (connecting ships to global networks to exchange information makes them vulnerable to cyberattacks) to prevent interference and avoid threats that could affect the safety; knowledge of automated control systems (from machine installations to loading operations) for monitoring and operational maintenance of these systems; knowledge of digital communication (in particular, satellite phones, the Internet and other means of information exchange) for security and coordination of operations; knowledge of analytics and data management for rapid benchmarking, optimization and management of information flows and informed decision-making.

The ability to solve professional tasks is ensured by the availability of knowledge about the sources of information and the processes of its processing based on micro cognitive actions inherent in critical thinking (analysis, formalization, comparison, generalization, and integration of incoming information with the existing knowledge base, development of information use cases,

forecasting the consequences of solving a problem situation, generating and forecasting the use of new information and its interaction with the existing one knowledge base knowledge about the differences between automated and manual information processes based on (i.e. the organization of storage and retrieval of information in a long-term mode). The cognitive criterion of the IDC of future officers characterizes the understanding of the essence of the technological approach to the implementation of activities; the ability to use information technologies for searching, processing, and storing information; identifying, creating, and forecasting possible technological stages of processing information flows; understanding of the principles of operation, capabilities, and limitations of technological devices designed for automatic search and processing of information, acquisition of a set of knowledge about information processes in nature and society, which make it possible to create internal technologies; understanding of the principles of operation, capabilities, and limitations of technological devices designed for automatic search and processing of information.

Thus, the cognitive criterion of the IDC of future officers characterizes the list of knowledge in information and digital technologies with a projection on the specific industry and covers the knowledge that characterizes modern IT and DT and the areas of their application. Accordingly, the measure of this component is a cognitive criterion with the indicator "Knowledge about IT & DT in general and in the industry".

The activity criterion for forming the procedural component of the IDC of future officers covers the ability to use DT and IT, which will allow you to make informed decisions. These include basic and special skills in working with information, which involves the ability to use modern technologies to search, access, store, process, and present information content. The ability to work with information shows the ability to apply appropriate operations for the search, transformation, and use of information of various natures in professional activities.

The procedural component of the IDC of future officers is due to the importance of specialized skills to use IT in professional activities, which enable: the operational efficiency of future officers in solving current tasks (modern IT automates most operations, improves operational efficiency, prevents errors, etc.); improving situational awareness (through real-time monitoring of weather conditions, identification of potential risks, etc.) to make informed decisions and prevent potential threats; improved communication (communication and data exchange between different platforms, and systems) for coordination of actions in the context of emergency (including military) operations; cybersecurity and personnel on board; decision-making based on IT data; professional development (in particular, in the fields of programming languages, data analysis and visualization, network technologies, databases, cloud computing). Accordingly, the measure of this component is the activity criterion with the indicator "Ability to use DT and IT to solve professional problems".

The process of development of the IDC has a multi-level nature, that is, when it comes to acquiring the IDC, it means development at a certain level. The transition from one level to another takes place sequentially and continuously from lower to higher. Each previous level is a prerequisite for the formation of the next one, and a timely and objective determination of the formation level makes it possible to determine the ways of timely influence. We followed the opinion of A. Shtymak (2015), suggests relying on a three-level gradation when determining the level of competence: low, medium, and high, since it, in our opinion, is the most universal and the most understandable.

Below we present a qualitative description of the levels of development of the IDC of future officers at each of the three levels.

Low level of development of the IDC of future officers

The low level is characterized by a lack of sustained interest in information technology and a lack of stable aspirations to use IT in future professional activities; lack of motivation to independently search and use new information; are not interested in understanding the principles of operation, capabilities, and limitations of technical devices, do not see the need to apply them in future professional activities, are not able to overcome the difficulties that arise when working with information content. The knowledge of future officers is formal, as they have an episodic interest in IT. They do not have formed common values when using IT, or the ability to consciously control the results of their activities. There is no initiative to use IT in a professional situation. They have a weak desire for their own development and personal growth. They have an undeveloped ability to self-assess and introspect their activities in using IT and DT.

Future officers with a low level of IDC have basic skills in the field of IT and DT, which are critically important for their future professional activities: the basics of working with computers and software, knowledge of the basic principles of information security (the ability to use operating systems, text editors, spreadsheets and other general-purpose software, mail programs for organizing daily work and communication with colleagues). The officers have non-systematic knowledge of the basic information security principles, at that level. They understand how to protect their data and systems from unauthorized access, but they have an incomplete knowledge of the basics of information encryption and methods of secure data transmission to ensure information security in military operations. Also, officers with a low level of IDC are familiar with digital platforms variety and tools that can be useful in their activities and have a fragmented interest in using online resources to obtain information, share experiences, and collaborate with other specialists. They need help navigating and using digital resources to collect and analyze information. They have a limited ability to adapt to new technologies and digital systems to search for and analyze data in the digital environment. They lack experience with specialized military command and control systems, monitoring systems, or communication platforms. They have low motivation to develop digital skills and difficulty adapting to or implementing new technologies in military operations. They have fragmented skills in solving problems related to information systems and technologies. They may require ongoing assistance and support from technical staff.

Average level of development of the IDC of future officers

The officers with an average level of development of the IDC have the following characteristics: they have an episodic interest in both the use of IT and DT; inherently unstable positive motivation to acquire knowledge, skills, and abilities in the field of IT; the desire to use IT and digital devices in future professional activities can be traced, but is not systematic; there is a point critical assessment of the involvement of IT in solving professional problems. They are characterized by the presence of knowledge of the differences between automated and automatic execution of information processes and the ability to classify

tasks by type with the subsequent selection of the appropriate information tool; understanding of how digital tools work, but not always taking into account their limitations and security. Existing skills in working with information flows and technological skills that are not sufficiently applied in practice; limited ability to apply appropriate operations for searching, transforming, and using data of various types (numbers, text, tables, schemes, etc.). An essential condition for attribution to the average level of informatics competence formation is a strong desire to achieve a higher level of ICT and awareness of the shortcomings of one's training. They are characterized by the formation of common values, manifested in the rational selection and conscious application of certain IT, but not always with the obligatory achievement of a successful result. They can't fully maintain self-control, show initiative and determination to use IT, or consciously control the results of their activities, or the level of their growth, they do not have sufficiently expressed skills of self-assessment and self-analysis when processing information content.

At the same time, future officers with an intermediate level of IDC have more complex skills that allow them to use DT and specialized software in their activities effectively – this is knowledge of programs that are used to plan and manage operations (battle management systems, navigation programs, etc., control of unmanned systems). They know digital data analysis tools and how to use them to identify trends and forecasts and assess risks. Have the skills to use analytical tools to process information (about weather conditions, sea currents, and other factors), reducing the likelihood of planning errors. Future officers with an intermediate IDC level understand cybersecurity and information protection principles. They know how to protect information systems, detect and prevent cyber threats, and learn data confidentiality principles. Able to use essential digital tools and systems in professional activities and effectively use digital platforms for communication, collaboration, and information exchange. They can adapt to new technologies and implement them in their activities. They can effectively solve standard problems using information systems, independently search for information, and use resources to solve technical issues. Consciously participate in training programs that include IT and DT, master new technologies, and implement them in their professional activities.

High level of development of the IDC of future officers

The officers with a high level of development of the IDC are characterized by: the presence of a stable interest in the use of IT & DT in their professional activities, positive motivation, a strong desire for professional self-improvement in the field of IT, and a positive result in the use of IT. Future officers at a high level of development of the ICC have a solid and systematic knowledge of IT, skills in working with information and information sources, capable of practical and creative problem-solving with the involvement of IT. Officers are characterized by a high level of formation of skills of independent work, which gives the activity a creative nature. They can maintain self-control, show a non-standard approach to solving problems with the help of IT, can independently make informed decisions and instantly move on to their implementation, have well-developed organizational skills in achieving the goal, ability to analyze and introspect their own activities. A characteristic personality trait is the presence of clearly formed values for working with IT and DT. They can control the results of their activities and track the dynamics of personal growth, striving to involve what they have acquired in professional activities.

At a high level of the IDC, future officers demonstrate the ability to manage information systems at a strategic level, possess technological tools, and optimize the use of IT & DT in military operations. Officers with a high level of IDC can integrate DT into military force management strategies, allowing them to respond effectively to dynamic changes in operational circumstances. Officers have developed critical thinking, enabling them to evaluate existing technologies and adapt them to specific needs, particularly initiating new approaches to systematizing information sources. But what truly sets them apart is their leadership. They are proficient in working independently with digital tools, forming teams capable of prompt response, and implementing innovative solutions. Their leadership skills extend to digital communication and information system management, making them invaluable assets in the digital age.

They are characterized by in-depth knowledge of specialized digital tools and technologies (GIS, data analysis, etc.), have significant experience in using digital platforms for complex problem-solving, decision-making, and strategic planning, have a deep understanding of cybersecurity and data protection principles, including threat analysis and risk management, and can lead and train others on the use of IT & DT to solve professional problems. They have experience working with new technologies (in particular, artificial intelligence, blockchain, and the Internet of Things) and experience in their application in operations. They have honed their skills in critical analysis and evaluation of information in the digital environment, demonstrating a high level of motivation to improve their digital skills. Their ability to quickly adapt to new digital technologies and innovations in the specific industry is a testament to their resilience and readiness to embrace change. They are well-equipped to provide technical support and advice to other team or unit members and train and mentor others using information and digital technologies.

CONCLUSIONS

To assess the levels of development of the IDC of future officers, the criteria (motivational and value, cognitive and activity) and the relevant indicators (the presence of motives, value attitudes for self-development, knowledge about IT & DT in general and in the industry, the ability to use DT and IT to solve professional problems) have been determined, which made it possible to qualitatively characterize the development levels: low, medium and high. The information and digital competence levels of future officers determine their ability to use modern technologies to perform their duties effectively. A low level may be sufficient for basic tasks, but medium and high levels are critical for managing complex operations and adapting to the performance of professional duties.

The developed diagnostic apparatus makes it possible to check the effectiveness of the model of development of the IDC of future officers in a nonformal education context and opens up other areas for research related to the development of the IDC of different specialists.

REFERENCES

1. Annenkova, I. P. (2011). Criteria and indicators of the quality of education in higher education institutions. *Bulletin of the Odessa National University*, 8. URL: http://archive.nbuv.gov.ua/portal/Soc_Gum/NiO/2011_8/ped/Annen.htm.
2. Encyclopedia of Education (2008). *Academy of Pedagogical Sciences of Ukraine*. Kyiv: Yurinkom Inter.

3. Golovan, M. S., & Yatsenko, V. V. (2012). Essence and content of the concept of "research competence". *Theory and Methods of Teaching Fundamental Disciplines in Higher School: Collection of Scientific Papers*. Kryvyi Rih, VII, 55-62.
4. Hrona, N., Khomych, T., Semenog, O., Kharchenko, I., Yurchenko, A., & Semenikhina, O. (2024). Tools for the development of emotional intelligence: Cognitive native language teaching. *International Journal of Instruction*, 17(2), 599-616. <https://doi.org/10.29333/iji.2024.17233a>.
5. Maslak, L. P. (2010). *Formation of professional foreign language competence of future officers of radio engineering specialties*. Diss. ... Cand. ped. Sciences. Zhytomyr: Zhytomyr Ivan Franko State University.
6. Melnychuk, Y. (2018). Metodika formuvannya proektno-analytichoi kompetentnosti budutnykh ofetsnykiv-granichnykiv v protsesu professionalnoi podgotova" [Methods of forming project-analytical competence of future border guard officers in the process of professional training]. *Youth and the market*, 3 (158), 106–110.
7. Moroz, N. V. (2007). *Formation of socio-cultural competence as a component of professional training of cadets of higher military educational institutions*. Diss. ... Cand. ped. Sciences: 13.00.04. Khmelnytskyi.
8. Mulesa, P., Semenikhina, O., & Yurchenko, A. (2023). Diagnostic apparatus of researching the results of preparing teachers to use virtual visibility tools in professional activities. *Scientific Bulletin of Uzhhorod University. Series: «Pedagogy. Social Work»*, 2(53), 94–99. <https://doi.org/10.24144/2524-0609.2023.53.94-99>.
9. Reshetnik, S. M. (2013). Criteria, indicators and levels of readiness of future officers of the Internal Troops of the Ministry of Internal Affairs of Ukraine for service activities. *Collection of Scientific Papers of the Khmelnytsky Institute of Social Technologies of the University "Ukraine"*, 2 (8), 217–223.
10. Rudenko Y. O., Drushlyak, M. G., Shamonina, V. G., Ostroha, M. M., & Semenikhina, O. V. (2023a). DEVELOPMENT OF STUDENT'S ABILITY TO RESIST INFORMATION INFLUENCES. *Information Technologies and Learning Tools*, 94(2), 54-71. <https://doi.org/10.33407/itlt.v94i2.5162>.
11. Rudenko, Yu., Proshkin, V., Naboka, O., Yurchenko, A., & Semenikhina, O. (2023b). Using Bloom's taxonomy to assess information hygiene skills. *E-learning & Artificial Intelligence (AI) Scientific Editor Eugenia Smyrnova-Trybulska "E-learning"*, 15, Katowice–Cieszyn, 137–148. <https://doi.org/10.34916/el.2023.15.12>.
12. Semenog, O., Burtovy, R., & Yurchenko, A. (2022). Rozvytok informatsiino-tsyfrovoy kompetentnosti maibutnykh morskyykh ofitseriv v umovakh neformalnoi osvity: sutnist kluchovykh poniat [Development of information and digital competence of future marine officers in the conditions of informal education: the essence of key concepts]. *Fizyko-matematychna osvita –Physical and Mathematical Education*, 36(4), 70-78. <https://doi.org/10.31110/2413-1571-2022-036-4-010>.
13. Shtymak, A.Y. (2015). Technology for determining the level of competence of a university graduate using algorithms of fuzzy logical inference. *Bulletin of Lviv Polytechnic National University. Series: Computer Science and Information Technology*. 826, 109–122. URL: <http://ena.lp.edu.ua/handle/ntb/31305>.
14. Slyusarenko, N. (2015). Realization of the need for communication in the professional activities of specialists in the maritime industry. *Tavria Bulletin of Education*. Kherson: KVNZ "KhANO", 2 (50), 2, 152–155.
15. Torichnyi, O. V. (2012). *Theory and practice of formation of military-special competence of future border guard officers in the process of training*. Khmelnytskyi: Publishing house of the National Academy of the State Border Guard Service of Ukraine named after B. Khmelnytsky.
16. Yevsyukov, O. F. (2006). *Pedagogical conditions for the formation of professional competence of future officers in the educational process of a higher military educational institution*. Dis... Cand. ped. Science: 13.00.04. Kharkiv National Pedagogical University. Kharkiv.
17. Yevsyukov, O. F. (2006). *Pedagogical conditions for the formation of professional competence of future officers in the educational process of a higher military educational institution*. Diss. ... Cand. ped. Science: 13.00.04. Kharkiv National Pedagogical University. Kharkiv.

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