RESULTS OF THE STUDY OF INFORMATION COMPETENCE FORMATION OF FUTURE SPECIALISTS IN NAVIGATION AND SHIP HANDLING

INTRODUCTION

Nowadays, due to the rapid increase in the volume of information, the importance of information processing skills for representatives of all professions and branches of knowledge is increasing. Many scientists pay attention to the importance of developing information competence to future specialists in navigation and ship handling. The specifics of preparing future navigators to communicate in a foreign language are studied by S. Barsuk (2016); O. Zabolotska (2019); Yu. Petrovska (2012) talk about the importance of forming socio-cultural competence and, accordingly, the specifics of receiving information during interpersonal contacts of future navigators. Researchers S. Dzhezhul (2011), H. Popova (2018) identified the specifics of utilizing the potential of information and communication technologies in the professional training of future navigation and ship handling specialists. The problems of formation of information culture to future navigators are studied by O. Bezbakh (2017); I. Sokol (2011) and M. Sherman (2016). A. Balendir et al. (2018, 2019, 2021); O. Didenko et al. (2020); O Komarnytska et al. (2019); O. Soroka et al. (2019) dedicated their works to investigating the peculiarities of introduction of information technologies into the educational process of higher education institutions. Scientists have characterized the problems of professional training of future engine navigators in the conditions of information society, they also found out the peculiarities of using information and computer technologies in professional training of future engineer navigators, revealed the essence and features of information culture of future navigators, offered to use historical material while studying academic discipline «Marine astronomy» to increase efficiency of learning the information. However, the issues of using the potential of various methods and techniques for the formation of this professionally important qualities, development of skills and abilities of information activities while studying the academic disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Actions in Accidents, Search and Rescue at Sea», «Navigation Information Systems» haven’t been studied enough yet.

RESEARCH PROBLEM

The necessity of research of ways of formation of information competence of future specialists in navigation and ship handling in the process of professional training in maritime institutions of higher education is caused by a number of factors. Firstly, in today's globalized world, successful and effective professional activities require a set of skills and abilities to use...
information in different types and forms, as well as to work with information. Secondly, the international labour market in the global navigation requires a high level of training of maritime industry specialists in general and specialists in navigation and ship handling in particular. The requirements of international regulatory documents, in particular the Maritime Labour Convention (CONVENTION, 2006), presuppose ensuring control of standards of ship’s crew training, quality of knowledge, skills and competencies acquisition, among which is the ability to use electronic cartographic navigation and information systems, information and communication technologies in practice.

The importance of the formation of information competence to future specialists in navigation and ship handling is confirmed by the requirements of the standard of higher education on specialty 271 «River and sea transport» for the first (Bachelor) level of higher education (EDUCATIONAL PROGRAM, 2021). The document stipulates that future specialist in navigation and ship handling must be able to manoeuvre and control the ship using modern electronic radar, electronic cartographic navigation and information systems, be skilled in using information and communication technologies, be able to ensure safe navigation through the use of electronic cartographic navigation and information systems, etc.

The relevance of the topic is also strengthened by the insufficient level of its theoretical and methodological justification. Pedagogical conditions of formation of information competence to future specialists in navigation and ship handling in the process of professional training, specification of criteria and indicators of formation of information competence, as well as justification of holistic scientific and methodological support of its formation taking into account national and foreign educational trends in training specialists of river and sea transport require justification. The task of teachers is to intensify the formation of information competence, to create conditions for future specialists to learn to choose optimal ways of solving problems, the object of which is information, to effectively use information and communication technologies in the professional sphere, to be able to organize their own information activities, to find the necessary information sources to solve various problems of a professional nature. Taking this into account, the aim of the article is to characterize the features of formation of information competence of future specialists in navigation and ship handling.

**RESEARCH METHODS**

To find out the peculiarities of formation of information competence to future specialists in navigation and ship handling, it was important to analyse the literature on the problem and determine the scientific apparatus. Based on the analysis of scientific sources the essence, content and structure of information competence, the criteria, indicators and levels of its formation were clarified, then in the course of the pedagogical experiment the pedagogical conditions of its formation were tested.

The formative stage of the pedagogical experiment was organized from September 2019 to June 2021 at the Danube Institute of the National University «Odessa Maritime Academy», with cadets who studied in the specialty «River and sea transport» specialization «Navigation and handling of sea vessels». The experiment involved 338 cadets and 12 scientific and pedagogical employees of the Department of Navigation and Ship Handling.

To determine the state of the formed motivational and personal component of information competence of future navigators a survey was conducted, which helped to find out the attitude of cadets to the study of disciplines «Ocean routes of the world», «Navigation bridge resource management», «Actions in accidents, search and rescue at sea», «Navigation information systems», as well as cognitive interests in the field of information activity and navigation information. The state of the formed information and cognitive component of the information competence of cadets (understanding of the essence of information competence and the specifics of working with navigational information, types of information activities of the navigator, knowledge of peculiarities of oral and written reproduction of information on traffic control of sea and river vehicles) was determined by semi-projective questionnaire in the form of incomplete sentences. The cadets were also asked questions about the ability to obtain information as part of a group and how to use it effectively to achieve a specific professional goal.

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To determine the state of the formed activity-operational component of information competence various professionally oriented tasks were used for which cadets had to give definitions and explain the essence of concepts from the sphere of navigation, get information during interpersonal contacts and teamwork, as well as independently find new information, work with different information sources, types of literature on navigation processes, solve complex specialized problems, and practical problems in the field of navigation.

The results of using all diagnostic techniques have shown that the level of information competence of future specialists in navigation and ship handling does not always meet the needs of professional activity. Most cadets do not clearly know the specifics of working with information, types of information activities of a navigator, they often fail to properly assess and apply information in various forms to solve complex specialized tasks and practical problems of navigation. Relevant is the acquaintance of cadets with the peculiarities of using information for proper management of personnel on the bridge, formation of their ability to summarize, analyse and use information in professional and social interaction, development of the ability to solve typical and non-typical professional situations in the field of shipping.

**RESEARCH RESULTS**

The formation of information competence is important for future specialists in navigation and ship handling. Their profession is associated with the need for constant expansion of knowledge, self-learning and self-development, it is characterized by novelty, non-standard situations, requires a constant search for different solutions to the problem. That's why the navigator should be able to find, use both known and unknown information to solve complex specialized tasks and practical problems in the field of shipping and ship engineering. With the help of information the navigator can not only find confirmation of their actions, but also better predict, foresee the consequences and adjust actions, find solutions for non-standard situations. Skillful handling of information indicates readiness for non-standard and unexpected situations, the personal potential to work in conditions of uncertainty and risk. Information competence covers the system of knowledge about the information environment, peculiarities of creation, organization and distribution of information, types of information activities of the navigator, purpose and composition of navigation information system, methods of evaluation of navigation information obtained from all sources, including radar, means of CD Radar observation and plotting and electronic complexes of navigation and information system in order to make decisions to avoid collision and provide safe ship’s navigation.

In order to make the necessary decision on the basis of the known information, the navigator must be able to distinguish the most important from the set of secondary, independently analyse the information situation, be able to identify signals, select the most significant from the environment of others, decode them, eliminate interference, have operator skills, be able to simulate navigation processes to determine the location and optimal use of all navigation data, assess meteorological conditions for safe navigation, choose the best way to perform a voyage in different areas of the world ocean.

The ability to find, understand, evaluate, and apply information in a variety of forms to solve personal, social, or global problems is important. The navigator must be able to make corrections of information, in particular concerning the ship’s position, sea area display, mode and orientation, cartographic data, route observations, information displays, contact results (if there is interaction with automated information systems and/or radar observation), and to analyse radar overlay functions (if there is interaction). A specialist in navigation and ship control must be able to select, assimilate, process, transform and generate information into a special type of subject-specific knowledge that allows to produce, predict and make optimal decisions on vessel movement and management of safe navigation of the vessel, as well as actions in unforeseen conditions, in particular in case of emergency situations and receiving distress signal at sea, for protection and safety of passengers, crew, vessel and cargo, to coordinate search and rescue operations. The ability of the navigator to carry out information and analytical processing of information related to ship control systems, navigation information resources control, information security systems is important.
In general, the information competence of a specialist in navigation and ship handling is an integrative personal quality, which covers the motivation for information activity, conscious attitude and interest in navigational information, knowledge of the types of information activities of a navigator, the purpose and composition of the navigation information system, the ability to search for necessary information, navigate information flows and communications, make optimal use of all navigational data, carry out information and analytical processing of information relating to ship control systems, navigational information resources and information security systems. The component composition of information competence of a specialist in navigation and ship handling covers motivational-personal, information-cognitive and activity-operational components.

Taking into account the structure of information competence of navigation and ship handling specialists, three criteria have been proposed for diagnostics of its formation: personal, cognitive and activity. Such indicators as motivation to study the problems of information and information activities in the field of ship navigation; stable cognitive interests in the field of information activity and navigation information, curiosity and desire for new things; self-organization, the ability to analyse your work with navigational information; willingness to improve the level of knowledge about information competence correspond to the personal criterion of information competence; cadets’ understanding of the essence of information competence and the specifics of working with navigational information; knowledge of the features of oral and written reproduction of information on the control of sea and river transport; awareness of the specifics of information-analytical processing of information related to the management of navigational information resources and information security systems are the indicators of the cognitive criterion of information competence. The indicators of the activity criterion are the ability to find new information independently, to work with different sources of information, types of literature on the processes of navigation; ability to evaluate and apply information in various forms to solve complex specialized problems and practical problems in the field of navigation; ability to use the capabilities of information and computer technology, navigation information systems in navigation; the ability to define and explain the essence of concepts from the field of navigation, to obtain information during interpersonal contacts and teamwork. Assessment of the information competence level of future specialists in navigation and ship handling is to be carried out according to the following levels: initial, sufficient and high.

According to the results of the ascertaining stage of the pedagogical experiment, conducted in April-May 2019 at the Danube Institute of the National University «Odessa Maritime Academy», it was revealed that only 15.85% of cadets had a high level of information competence. Most participants in the experiment are at the sufficient - 42.25% and initial - 41.90% levels. Cadets are not able to independently find new information from different sources, work with different sources of information, kinds and types of literature on navigation processes, are not able to properly assess and apply information in different forms to solve complex specialized tasks and practical problems in the field of navigation. In general, the diagnostics of the formed information competence of future specialists in navigation and ship handling showed the need for systematic work to improve its level during professional training.

To find out pedagogical conditions of formation of information competence to future specialists in navigation and ship handling, the importance of cadets’ abilities to perceive information during contacts with other people and to express their thoughts clearly for establishing interpersonal interaction and performing the tasks of professional activity was taken into consideration. It is confirmed by S. Dean, who notes that «of all the species that inhabit the Earth, only humans practice the voluntary exchange of information. Through language we learn a lot from others... Verbalization is an inherent characteristic of conscious knowledge» (DEAN, 2021). Given the need to teach cadets to get information as part of a group, defend their position, and get their ideas implemented, cooperate and work, make decisions to resolve disagreements and conflicts, negotiate for a common purpose or to fulfill contracts an important condition for the formation of information competence is the use of interactive methods to form the cadets’ ability to summarize, analyse and use information during professional and social interaction. As for the second pedagogical condition – use of problem tasks of different levels of complexity for cadets to acquire the ability and skills to
solve typical and atypical professional situations in the field of navigation – it was taken into account that the professional activity of a specialist in navigation and control systems concerns primarily the solution of complex specialized tasks and practical problems in the field of navigation and ship engineering, which require awareness of the ship structure, navigation, mechanical and electrical engineering, vehicle operation, resource management (EDUCATIONAL PROGRAM, 2021). The obligatory of this pedagogical condition is also due to the potential of problem-based learning methods, the need to process a large amount of information for their implementation.

One more pedagogical condition for formation of information competence to future specialists in navigation and ship handling provides methodical support of research and project activity of cadets for development of their ability to collect and analyze information. In this case, it is taken into account that the methodology of cognition has changed significantly in the information age. As O. Sydorenko and V. Chuba note, «the former methodology, which expressed the essence of industrial society, deterministic cognition and simultaneous evaluation, is being replaced by the methodology of information society, pluralistic cognition and probabilistic evaluation» (SYDORENKO, CHUBA, 2001). Scholars emphasize that today «the teacher has lost their monopoly on information. He has begun to turn into a spiritual leader, an information coach» (SYDORENKO, CHUBA, 2001). In an information society, the instructor loses their role as a source of knowledge; they search for the truth together with the cadets. From the point of view of cognitive psychology, S. Dean notes, the importance of exploratory learning is that «effective learning requires active participation, curiosity, constant generation of hypotheses and their testing in the outside world... Without concentration and deep reflection, the lesson will fade, leaving no discernible trace in the brain ... therefore, the deeper the processing, the better the learning» (DEAN, 2021). The fourth pedagogical condition of formation of information competence to future specialists in navigation and ship handling, taking into account the specifics of their professional activity, which is impossible without the ability to analyze information obtained using modern electronic navigation systems, has been defined as the development of skills in the field of information technology application, information support of navigation information systems.

Then, to test the effectiveness of pedagogical conditions for the formation of information competence there was organized the formative stage of the pedagogical experiment (from September 2019 to June 2021) at the Danube Institute of the National University «Odessa Maritime Academy» and Kherson State Maritime Academy. After consultation with teachers, appropriate teaching and learning materials were developed, primarily materials for teaching academic disciplines. According to the first direction of work during the formative stage of the experiment when teaching the academic disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Emergency Response, Search and Rescue at Sea», «Navigation Information Systems» instructors used such interactive forms and methods, according to S. Sysoeva (2011), as collective solution of creative tasks, case method, practical group and individual exercises, heuristic conversations, discussions, methods of «brainstorming» and «round table» (SYSOIEVA, 2011).

In particular, an important interactive method based on dialogue was the collective solution of creative tasks, that is, tasks without complete information, tasks for prediction, optimization, or reviewing. When studying «Bridge Resource Management», the cadets predicted the situation of discussing the distribution of responsibilities and prioritizing the use of bridge resources, identifying opportunities to optimize interpersonal relationships and improve information exchange between the bridge team, with each other, with the engine room and other departments. The tasks including evaluation of the order and effectiveness of the passage plan discussion, specific actions required for high traffic areas, shallow water, speed limits, engine requirements, and stations were important as well. Such tasks helped to form the cadets’ ability to explain the essence of concepts from the sphere of ship navigation, to spread information about personnel management on the ship and its preparation for solving everyday working tasks. In turn, with the help of dialogical methods, in particular dialogue-conversation, dialogue-intrigue, dialogue-problem, dialogue-presentation, dialogue-actualization, dialogue-encouragement, argumentative dialogue, the instructors formed the cadets’ abilities to obtain information as a member of a group. In particular, cadets discussed the role of information in the organizational and functional structure of navigation bridge resource.
management, the specifics of information support for management decision-making and the organization of the bridge team and transition planning, peculiarities of the information aspect of organizing the interaction of the navigational watch crew on the bridge, interaction with the pilot, port services, etc. The cadets have learned the importance of situational awareness, awareness of what’s going on outside the bridge windows, and the importance of information competence to teamwork for the ship’s captain.

In such a way cadets learned to obtain information as a part of the group and use it effectively to achieve a specific goal of professional activity, justify their point of view and draw conclusions, using the basic theories and concepts in the field of ship navigation. By completing such assignments, the cadets learned the necessary concepts, learned how to disseminate information on shipboard personnel management and its preparation for daily work tasks and workload management, to convey information, ideas, problems and their solutions to specialists and non-specialists, own experience in the field of ship navigation. Future navigation and ship handling specialists learned how to work as a team, create queries to various databases to solve a problem, interview others, consult experts, and get information during business conversations and negotiations.

In accordance with the second pedagogical condition during the experimental work there were used problem tasks of different levels of complexity for cadets to acquire abilities and skills to solve typical and non-typical professional situations in the field of navigation. Instructors offered cadets an appropriate selection of tasks that provided for the formation of ways of action. Many problem tasks had a clearly defined situational character, i.e., cadets had to comprehend important professional situations. The description of this situation simultaneously reflected a particular practical problem, at the same time updating the practical set of knowledge necessary to be learned in order to solve the problem. For example, during the course «Navigational Bridge Resource Management», instructors offered cadets the following problem: «The pilot goes up to the bridge. The captain does not know the peculiarities of the area». The cadets had to answer the following questions: What information should he discuss with the pilot? What questions should he ask to discuss the intended crossing with the pilot? On what points should this discussion take place? How should all defects that could affect the safe navigation or manoeuvrability of a vessel be discussed and listed on the Pilot Card? How should information exchange be organized under the VDR microphone? After mooring in port and before the pilot leaves the ship, what points should you discuss with the pilot about the pilot’s departure passage plan to help make an effective «departure passage plan»?

Problematic character had also situational tasks; in particular, we paid great attention to the method of cases. In the methodological aspect, the method of cases required the use of such methods of knowledge as modelling, system analysis, problem method, description, classification, game methods, etc. (HUMENNYKOVA, 2020). The instructors first presented the case, and then the cadets studied and proposed solutions, discussed and defended their version. Cadets solved cases of various types; in particular they characterized the types of information exchange during the voyage, they found out the factors affecting its effectiveness, prepared speeches on the information competence of the navigational and ship handling specialist, the role of information exchange between members of the navigational watch on the bridge, determined the measures to be taken by the captain of a team with poor cohesion.

The use of this method helped form the necessary knowledge in the cadets through co-creativity and cooperation, to teach them in conditions close to real practice; develop critical thinking, problem-solving skills, and informed decision-making; increase interest in the problems discussed and responsibility for the decisions made.

In addition, instructors offered cadets to solve complex specialized tasks and practical problems in the field of navigation, requiring systematic knowledge and orientation in the problem field of navigation. In particular, the cadets had to find out the peculiarities of mooring the vessel from the port berth and steering the vessel to the anchorage. To accomplish this task, cadets first learned the maneuvering characteristics of their vessel and filled out the Wheel House poster checklist, then tested themselves as a captain or watchman, plotting the ship’s movement from the port exit to the anchorage on the electronic chart of the navigation information system (Electronic Chart Display and Information System – ECDIS) and entering the
data into the transition route (Route Plan). To accomplish such tasks, cadets evaluated and applied information in a variety of forms, including text, graphic, and electronic. The method of problem situation analysis helped to teach cadets to analyse and predict processes and the state of navigational equipment under conditions of incomplete or limited information, to plan and navigate the voyage. Problem analysis became an important stage in the intellectual analytical activity of cadets, with the emphasis shifting from knowledge transfer to the development of analytical skills and decision-making, which helped teach cadets to make decisions to resolve disagreements and conflicts, to negotiate for a common goal or to fulfill contracts, and to find new solutions. According to the third pedagogical condition there was provided methodological support of research and project activities of cadets to develop their ability to collect and analyse information. Educational and methodological support of research and project activities of cadets covered a set of methodological and informational educational materials in accordance with the program of academic disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Emergency Response, Search and Rescue at Sea», «Navigation Information Systems» (EDUCATIONAL PROGRAM, 2021).

These tasks were developed taking into account the cadets’ independent choice of an individual educational trajectory. The complex included research and project tasks of different levels of complexity, to solve which cadets had to choose the necessary sources of information, abstract the contents of the readings or determine their main point, solve a problem, and prepare a report. These tasks involved problems that required a deep orientation in various formats of information and the ability to find rational options, ways, and technologies for solutions. We first accompanied individual tasks with instructional texts to organize group searches. The content of the research and project tasks had a professional direction, at the same time relying on the cadets’ knowledge and requiring a search for non-standard approaches to finding a solution. For example, when teaching academic discipline «Management of navigational bridge resources» instructors offered cadets to solve research tasks on information exchange for the safety of manoeuvring the ship in different sailing conditions, information support for error correction in navigational bridge resource management, determining the specifics of navigational Watchkeeping and communication between watch members during the voyage, specifics of information competence of the captain-leader in emergency situations, the essence of information exchange as a prerequisite for effective teamwork on the bridge, typical causes of ineffective information exchange on the bridge, features of information exchange of the specialist in navigation and ship handling, basic requirements for the information exchange of a specialist in navigation and ship handling etc.

By solving such problems, cadets practiced the ability to distinguish between essential and unimportant, causes and consequences, to classify, prove, and defend their opinions. Performing such tasks helped the cadets gradually gain experience in solving complex problems of professional nature, learn more about information support measures for management decision-making on the bridge, effective information sharing, the basic techniques of analysing information from the field of navigation, analytical evaluation of information about navigational processes, certain areas of improvement in the control of navigational information resources.

The fourth direction of formation of information competence to future specialists in navigation and ship handling provided for the development of their skills in the application of information technologies, information support of navigation information systems. While teaching the disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Emergency Response, Search and Rescue at Sea», «Navigation Information Systems», the instructors widely practiced the use of Internet resources, in particular, to search for information on the ECDIS mapping, the rules for displaying map information, display characteristics, presentations of operational information, map image control, ship’s movement control, mooring regime, alarm control, search and rescue functions, ECDIS training functions, etc.

It was specified that cadets should use tools and searching systems, particularly specific software, electronic textbooks, software applications, specialized online services (interlibrary card, professional associations, institutional research units, community resources, experts and
practitioners) to perform such tasks. In this way, cadets learned to select the best research methods or information searching systems to obtain information regarding basic laws, theories, principles, methods, and concepts of navigating and handling seagoing vessels. They developed and practiced a search strategy using appropriate commands for selected information searching systems (logical operators, internal classifiers), learned to use different user interfaces and search engines, with different command languages, protocols, and search parameters.

WebQuests were an important technology that made use of the information resources of the Internet and that instructors practiced extensively during experimental teaching. Their structure was similar to that of computer help and information systems with hypertext. The instructors first explained to the cadets how to work, defined the problem, a preliminary plan, a deadline, assigned roles, and announced the criteria for evaluating the work. Then the problem was divided into separate subtasks, and the cadets decided on the final result and the ways to achieve it, finding out the necessary information sources. The results of their work were presented in various forms: web pages, Web sites, slide shows, booklets, animations, posters, photo reports, databases, histories, and online documents. After that, a discussion of the results of the WebQuests, summing up the work, and the generalization of experience were of great importance. In particular, when studying the «Navigation Information Systems» discipline, cadets carried out quests on the history of navigation information systems, their types and functions. Several quests involved introducing information in a new format, such as a presentation, stories about the composition of the court navigation and information system, features of hardware, software and information support. We also encouraged the cadets to make a plan / project for ECDIS certification and its legal status, to transform the format of information obtained from various sources for the virtual exhibition to highlight the operational requirements of the International Maritime Organization (IMO) for ECDIS. The tasks of systematizing information on the reviewed IMO operational requirements for ECDIS, finding a solution to reach consensus on training requirements with ECDIS, and optimizing the ship’s movement plan were very important. Cadets also developed ECDIS legal web pages or systematized information about IMO requirements in the form of a web page. Such a process of converting information from various sources encouraged learning, contributed to the development of thinking, analytical abilities and information competence of future specialists in navigation and ship handling.

In addition, the use of simulation technologies with augmented and virtual reality became an important technology for training future navigators, based on information and computer technologies. The advantage of these maritime simulators (maritime simulator systems) is that they create conditions for modelling real-life situations on the operation of ships by using replicas of real equipment (STANDARD FOR CERTIFICATION, 2007). In order to effectively use simulation complexes with virtual reality, during the experimental study the instructors offered the cadets special tasks that provide thorough preliminary preparation and search for the necessary information.

All the tasks were performed by the cadets on the navigation simulator Navy – Trainer professional 5000 (NTPRO 5000). Before the assignment, the instructors formed a bridge crew and determined the job description for everyone, including the duties of the captain, the officer in charge of a navigational watch, the helmsman, and the assistant first mate. The captain made a decision about unmooring, turning the ship in the port water area and leaving the port on her own or with the help of tugboats. The cadets also practiced communication with the pilot station and approach to the place of receiving the pilot boat to the ship, entering the port, turning the ship in the port water area, mooring the ship to the pier with or without the help of tugs, anchoring the ship, navigating in the area of separation of vessel movement, leaving the area of separation of vessel movement.

In planning the crossing, the cadets used navigation systems to keep a continuous check and detect deviations from the course when the ship was in coastal waters. All entries in the logbook and check-lists were made by cadets based on communication between crew members on the bridge, as well as communication with pilot station, pilot and port state control. The cadets constantly monitored the changing distance to the pier and the
environment around the ship and made clear reports. In addition, the bridge crew, under the supervision of the captain, took all possible measures to ensure the safety of the ship. In this way the cadets learned to make corrections to information, in particular concerning their ship’s position, sea area display, mode and orientation, cartographic data, route observations, information displays, contact results (if there was interaction with automated information systems and/or radar observation), and analysed radar plotting functions (if there was interaction).

On the whole, in order to form information competence to future specialists in navigation and ship handling during the experimental training, the systematic work to develop their skills in using information technologies and information support of navigation information systems was planned. Specially designed tasks included cadets’ work with various types and sources of information and with Internet resources. During the work on sea simulators cadets learned to solve complex tasks and problems in the field of navigation, to choose information retrieval systems to access information, to analyse and predict the processes and state of navigation equipment in conditions of incomplete or limited information, planning and navigational workout of the voyage. By solving such problems, cadets learned to evaluate navigational information from all sources, including radar, automated radar plotting, and electronic navigation-information system complexes, in order to make decisions to avoid collision and control the safe navigation of the vessel.

CONCLUSIONS

After the formative stage of the pedagogical experiment it has been found that the cadets of the experimental and control groups significantly differ in the state of formation of all the components of information competence. According to the results of the study of the state of the formed motivational and personal component of information competence, obtained by means of surveys, it has been revealed that the EG cadets are more convinced of the need to improve their level of knowledge about information competence and work with navigational information. The majority (77.64 %) of cadets in the experimental group assessed the degree of development of their information competence by numbers «4» and «5» (on a scale of 0, 1, 2, 3, 4, 5) (61.90% of cadets in the control group). Cadets in the experimental and control groups (89.41 % and 84.52 % of respondents) recognize the importance of information competence for the navigator, but the representatives of the experimental group are able to explain more clearly why it is necessary to improve their information competence level. 94.71% of cadets in the experimental group pointed out the specifics of their work and the complications of modern navigation processes. In the control group 50.59 % of respondents noted that professional well-being, the ability to get a good job depend on the level of formation of this property. The cadets in the experimental group also believe that self-education is important for increasing the level of formation of information competence (in the experimental group this was noted by 56.47 % of respondents, in the control - 38.69 %). «The desire to learn new things» (in the experimental group it was noted by 27.05% of respondents, in the control group - 19.05%) is also noted as very important. As for the formation of the information and cognitive component of information competence, the results of semi-projective questioning, written questioning and testing have shown that the cadets in the experimental group have a more systematic understanding of the essence of information competence, the specifics of working with navigation information, types of information activities of the navigator. Among the cadets in the experimental group there are 9.21% more (compared to the control group) of those who at a high level have covered the essence of navigational information, information competence of a specialist in navigation and ship handling. The cadets in the experimental group are better at describing the types of information which the navigator works with and the situations of professional activity when they must be able to present or evaluate information. 25.29% of cadets in the experimental group gave answers to these questions at a high level (in the control group there were only 15.47%).

Significant differences have also been identified in the cadets’ awareness of the specifics of information-analytical processing of information related to the control of navigational information resources and information security systems. In the experimental group there were found 25.88 % of cadets who were able to identify parts of the text, fix the main idea, make a thesis plan and questions to the text at the high level (in the control group the tasks were
performed at the high level by 16.67 % of cadets). In the experimental group compared to the control group, there were 18.70 % more of those who, at a high and sufficient level, described the importance of using information for the proper management of personnel on the bridge, in particular what concerns the allocation of personnel, assigning duties, and prioritizing the use of resources.

24.71 % of cadets in the experimental group were able to explain at a high level what navigational information can be obtained by the group, what databases can be queried to obtain regulatory, managerial, reference, and additional information on ship handling. They are also able to better disclose what information can or cannot be discussed with the ship owner or the service customer, explain how information exchange occurs when managing navigational bridge resources, what linguistic means are available for settling disagreements and conflicts in a multi-ethnic and multi-confessional crew, what information can / cannot be exchanged when interacting with the ship’s crew. In the control group, only 17.07 % of cadets have performed this task at a high level.

Higher quantitative data have been obtained from the cadets in the experimental group on the formation of the activity-operational component of information competence. According to the results of professionally oriented tasks they showed the best ability to find new information independently, to work with different sources of information, types of literature on the processes of navigation. 27.06 % of cadets in this group were able to prepare at a high level a report on the characteristics of meteorological elements with the specified information sources used or to find sources to learn about the essence of the concept of «sea route» and its types. Among control group cadets, only 16.67 % were able to cope with this task at a high level. Most were only able to name certain relevant search systems for professionals in navigation and shipping, or Web sites containing information about sea and ocean routes.

It has also been revealed that the cadets in the experimental group are able to more thoroughly define and explain the essence of concepts from the sphere of ship navigation. During the interviews it turned out that 24.12 % of them gave a definition and explained the essence of concepts from the sphere of navigation at a high level. They proved their opinion on the main purpose of navigation information systems, their functions, the essence of information support, and electronic map data formats. They were able to convey their thoughts more accurately, properly present the information they knew, and justify their opinions. Only 14.28% of the control group cadets performed this task at a high level.

The results of the observation and the survey also have shown that among the EG cadets there are more of those who consider the importance of interpersonal contacts as an important source of navigational information, paying attention to the need to obtain information during interpersonal contacts and teamwork. The observation showed that among the cadets in the experimental group there are more of those who can always conduct a discussion in a more balanced way and have skills of persuasion. In this group there are more of those cadets (70.06 %) who follow the general rules of proving their position in discussions and do not use harsh words towards their opponent. (In the control group there are 54.76 % of such cadets). In general, the results of the experimental work showed that after completing the formative stage of the experiment the EG cadets have predominantly high (27.06 %) and sufficient (52.35 %) levels of information competence. In the CG, these data are 17.26 % and 42.26 %, respectively. The cadets in the experimental group revealed a higher level of formed abilities to independently find new information from different sources, to search for necessary information, to navigate in information flows and communications, to determine the availability of necessary information.

The results of the theoretical analysis of the problem and the data of the experimental work allowed to substantiate some methodological recommendations. To form information competence of future specialists in navigation and ship handling while teaching academic disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Actions in Accidents, Search and Rescue at Sea», «Navigation Information Systems» it is suggested to pay attention to the ability to generalize, analyse and use information in professional and social interactions; to offer students a collective solution to creative tasks, cases from the field of navigation; to acquaint them with the specifics of the analysis of
information from the sphere of navigation, the methods of meaningful grouping of material, compilation, oral and written reproduction of information; use problem tasks of different levels of complexity to acquire abilities and skills to solve typical and atypical professional situations in the field of shipping; provide methodological support for research and project activities, etc.

Prospects for further research in this direction include studying the specifics of the development of information competence of navigation and ship handling specialists during Master’s study, ways for implementing the best foreign experience of professional training of instructors to form informational competence of future specialists in navigation and ship handling.

REFERENCES

BALENDR, A. Designing professionally oriented training courses for border guards in accordance with the sectoral qualifications framework based on the virtual aula platform. *Information Technologies and Learning Tools*, 2018, 63 (1), p. 68-80. Available at: https://doi.org/10.33407/itlt.v63i1.1807 Access: Jan. 25, 2021.

BALENDR, A.; BILETSKYI, V.; IAKYMCHUK, A.; SINKEVYCH, S.; KOROLOV, V.; BLOSHCHYNSKYI, I. Implementation of European Border Guards’ Common Educational Standards in Ukraine: Comparative Analysis. *Romanian Journal for Multidimensional Education/Revista Romaneasca pentru Educatie Multidimensionala*, 2019, 11 (2). Available at: https://doi.org/10.18662/rrm/114 Access: Jan. 25, 2021.

BALENDR, A.; KOMARNYTSKA, O.; BLOSHCHYNSKYI, I. Ukrainian border guards interoperability assessment in the framework of common European border guard standards implementation. *Advanced Education*, 2019, No 12, p. 35-43. Available at: https://doi.org/10.20535/2410-8286.128196 Access: Jan. 25, 2021.

BALENDR, A.; KOMARNYTSKA, O.; BLOSHCHYNSKYI, I.; DIDENKO, O. Information and communication technologies in foreign languages training of the border guards in the European Union Countries. *Information Technologies and Learning Tools*, 2018, 67 (5), p. 56-71. Available at: https://doi.org/10.33407/itlt.v67i5.2305 Access: Jan. 25, 2021.

BALENDR, A.; KOMARNYTSKA, O.; ISLAMOVA, O.; KHAMAZIUK, O., LUSAN, P.; BILIAVETS, A. Online learning facilitation in foreign language training for border guards. *Laplage Em Revista*, 2021, 7 (2), p. 336-345. Available at: https://doi.org/10.24115/S2446-6220202172743 Access: Jan. 25, 2021.

BARSUK, S. L. Teaching dialogic speech to cadets - future navigators through interaction in professionally-oriented situations. *Young Scientist*, 2016, No 11, p. 405-409. Available at: http://nbuv.gov.ua/UJRN/molv_2016_11_97 Access: Jan. 25, 2021.

BEZBAKH, O. M. The study of the current state of the formed information culture of future navigators. *Information technology in education*, 2017, Vol. 1, p. 135-159. Available at: http://nbuv.gov.ua/UJRN/itvo_2017_1_12 02 Access: Jan. 25, 2021.

DEAN, S. How we learn. Why the brain learns better than the machine ... So far. Kyiv, 2021, 288p. Available at: https://laboratoria.pro/products/yak-mi-vchimosya-chomu-mozok-navchaetsya-krashe-nizh-mashina-poki-scho. Access: Jan. 25, 2021.

DIDENKO, O. V.; ANDROSHCHUK, O. S.; MASLII, O. M.; BALENDR, A. V.; BILIAVETS, S. Y. Electronic educational resources for training future officers of border guard units. *Information Technologies and Learning Tools*, 2020, 80 (6), p. 39-57. Available at: https://doi.org/10.33407/itlt.v80i6.3816 Access: Jan. 25, 2021.

DZHEZHUL, T. S. Use of Microsoft Excel as a tool for training future navigators in mathematics in higher maritime educational institutions. *Information technology in education*, 2011, No 10, p. 193-200. Available at: http://nbuv.gov.ua/UJRN/itvo_2011_10_30 17 Access: Jan. 25, 2021.
EDUCATIONAL PROGRAM FOR BACHELORS IN «NAVIGATION», specialty 271 «River and sea transport». Odessa: National University «Odessa Maritime Academy», 2021, 19c. Available at: http://www.onma.edu.ua/wp-content/uploads/2021/05/Proyekt_OPP_NiUMS_NNIMPiT-MAGISTR.pdf Access: Jan. 25, 2021.

HUMENNYKOVA, T. Case study as an integral part of the individualized educational content of the professional training of future navigators. Current Issues in the Humanities, 2020, No 29 (2). p. 131-137. Available at: http://nbuv.gov.ua/UJRN/apgnd_2020_29(2)_23 Access: Jan. 25, 2021.

INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, Certification and Watchkeeping for Seafarers, 1978 (consolidated text with Manila amendments). Available at: https://zakon.rada.gov.ua/laws/show/995_053#Text Access: Jan. 25, 2021.

KOMARNYTSKA, O. I.; BALENDR, A. V.; BLOSHCHYNSKYI, I. H. ESP teaching strategies of Ukrainian border guards training on the experience of European union countries. Journal of teaching English for specific and academic purposes, 2019, p. 455-465.

MARITIME LABOR CONVENTION, 2006. Available at: https://zakon.rada.gov.ua/laws/show/993_519#Text 11 September 2021 Access: Jan. 25, 2021.

PETROVSKA YU. V. Using a paraphrasing strategy to teach future navigators to keep a ship’s log, 2012, No. 23, p. 284–287. Available at: http://nbuv.gov.ua/UJRN/Nznuoaf_2012_23_94 Access: Jan. 25, 2021.

POPOVA H. V. Application of electronic educational resources in the professional training of future navigators. Pedagogical almanac, 2018, No. 40, p. 142–148. Available at: http://nbuv.gov.ua/UJRN/pedalm_2018_40_23 17 Access: Jan. 25, 2021.

SHERMAN, M. I.; BEZBAKH, O. M. Analysis of basic definitions of the study of information culture of future navigators. Information technology in education, 2016, No. 1, p. 48–73. Available at: http://nbuv.gov.ua/UJRN/itvo_2016_1_6 17. Access: Jan. 25, 2021.

SMELIKOVA, V. B. Experimental verification of the effectiveness of the methodology of preparing future navigators for professionally-oriented communication by means of case-technology. Scientific notes, 2016, Book. 2, p. 162-168. Available at: http://nbuv.gov.ua/UJRN/ Nzfn_2016_2_34 17. Access: Jan. 25, 2021.

SOKOL, I. The competence of the teacher as the key to the successful formation of information competence of cadets. Scientific Bulletin of the Uzhgorod National University, 2011, No. 22, p. 147–150. Available at: http://nbuv.gov.ua/UJRN/Nvuuoped_2011_22_53 17. Access: Jan. 25, 2021.

SOROKA, O.; KALAUR, S.; BALENDR, A. Monitoring of Corporate Culture Formation of Specialists of Social Institutions. Postmodern Openings/Deschideri Postmoderne, 2019, 11. Available at: https://lumenpublishing.com/journals/index.php/rrem/article/view/1470/pdf. Access: Jan. 25, 2021.

SYDORENKO, O.; CHUBA V. Situational teaching methodology: theory and practice. Kyiv, 2001, 256p. Available at: https://omolodim.at.ua/publ/sidorenko_o_chuba_v_situacijna_metodika_navicannj. Access: Jan. 25, 2021.

SYSOIEVA S. O. Interactive adult learning technologies. Kyiv: EKMO, 2011, 320 p. Available at: https://elibrary.kubg.edu.ua/id/eprint/7101/1 Access: Jan. 25, 2021.

ZABOLOTSKA, O. O. Methodological foundations for the formation of future navigators’ readiness for professionally oriented written communication. Pedagogical almanac, 2019, No. 42, p. 57-64. Available at: http://nbuv.gov.ua/UJRN/pedalm_2019_42_10 17 Access: Jan. 25, 2021.
Results of the study of information competence formation of future specialists in navigation and ship handling

Resultados do estudo da formação de competências de informações de futuros especialistas em navegação e manuseio de navios

Resultados del estudio de la formación de competencias de información de futuros especialistas en navegación y manipulación de buques

Resumo
O artigo apresenta os resultados de testes experimentais de condições pedagógicas para formação de competência informacional de futuros especialistas em navegação e manuseio de navios. Ao ensinar as disciplinas “Rotas Oceânicas do Mundo”, “Gestão de Recursos de Ponte de Navegação”, “Ações em Acidentes, Busca e Resgate no Mar”, “Sistemas de Informação de Navegação”, sugere-se usar métodos interativos para formar a capacidade dos cadetes de generalizar, analisar e usar informações durante a interação profissional, desenvolver a capacidade de disseminar informações sobre manuseio de embarcações, gerenciamento de carga de trabalho, compartilhar sua experiência na navegação com outras pessoas, fazer solicitações, dar sugestões sobre a resolução de problemas urgentes. Para desenvolver as habilidades dos cadetes no apoio à informação dos sistemas de informação de navegação, propõe-se a utilização de recursos educacionais eletrônicos, incluindo materiais educacionais, informativos, científicos, de referência apresentados em formulário eletrônico ou armazenados em redes de computadores. Destaca-se a importância das tecnologias modernas, incluindo recursos informativos da Internet, como blogs, web quests, blogs, além de tecnologias de simulação com realidade aumentada e virtual.

Palavras-chave: Competência da informação. Especialistas em navegação e manuseio de navios. Condições pedagógicas. Métodos interativos e problemáticos. Suporte metodológico.

Abstract
The article presents the results of experimental testing of pedagogical conditions for forming information competence of future specialists in navigation and ship handling. While teaching the disciplines «Ocean Routes of the World», «Navigation Bridge Resource Management», «Actions in Accidents, Search and Rescue at Sea», «Navigation Information Systems» it is suggested to use interactive methods to form the cadets’ ability to generalize, analyze and use information during professional interaction, develop the ability to spread information about vessel handling, workload management, to share their experience in navigation with other people, make requests, give suggestions on solving pressing problems. To develop cadets’ skills in information support of navigation information systems, it is proposed to use electronic educational resources, including educational, information, scientific, reference materials presented in electronic form or stored in computer networks. The importance of modern technologies, including information resources of the Internet, such as blogs, web quests, blog quests, as well as simulation technologies with augmented and virtual reality has been highlighted.

Keywords: Information competence. Navigation and ship handling specialists. Pedagogical conditions. Interactive and problem methods. Methodological support.

Resumen
El artículo presenta los resultados de las pruebas experimentales de las condiciones pedagógicas para formar la competencia de información de los futuros especialistas en navegación y manejo de buques. Al enseñar las disciplinas «Rutas Oceánicas del Mundo», «Gestión de Recursos de Puentes de Navegación», «Acciones en Accidentes, Búsqueda y Rescate en el Mar», «Sistemas de Información de Navegación», se sugiere utilizar métodos interactivos para formar la capacidad de los cadetes para generalizar, analizar y utilizar la información durante la interacción profesional, desarrollar la capacidad de difundir información sobre el manejo de embarcaciones, la gestión de la carga de trabajo, para compartir su experiencia en la navegación con otras personas, hacer solicitudes, dar sugerencias sobre la resolución de problemas apremiantes. Para desarrollar las habilidades de los cadetes en el apoyo a la información de los sistemas de información de navegación, se propone utilizar recursos educativos electrónicos, incluidos materiales educativos, informativos, científicos, de referencia presentados en forma electrónica o almacenados en redes informáticas. Se ha destacado la importancia de las tecnologías modernas, incluidos los recursos de información de Internet, como blogs, misiones web, misiones de blogs, así como tecnologías de simulación con realidad aumentada y virtual.

Palabras-clave: Competencia informativa. Especialistas en navegación y manipulación de buques. Condiciones pedagógicas. Métodos interactivos y problemáticos. Apoyo metodológico.