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ПЕДАГОГИЧЕСКАЯ ТЕХНОЛОГИЯ ПРОФЕССИОГРАФИЧЕСКОГО МОНИТОРИНГА: ТЕОРЕТИЧЕСКИЙ АНАЛИЗ И ПРАКТИЧЕСКОЕ ПРИМЕНЕНИЕ

***Аннотация:** в главе на английском языке представлены результаты исследования, которые ранее были опубликованы на русском языке, для более широкого круга читателей, преподавателей и исследователей. Работа посвящена изучению педагогической технологии профессиографического мониторинга процесса формирования мотивационного компонента профессиональной компетентности. Для экспериментальной работы исследование проводилось с внедрением профессиографического мониторинга в образовательный процесс профессиональной подготовки курсантов морского вуза в условиях смешанного обучения. Профессиографический мониторинг является малоизученной технологией, результатом работы является определение его функций, критериев оценки уровня мотивационного компонента профессиональной компетентности.*

***Ключевые слова:** педагогическая технология, профессиографический мониторинг, мотивационный компонент, профессиональная компетентность, профессиональная подготовка, высшее образование, морской университет, курсанты.*

***Abstract:** this chapter presents the results of the study in English, which were previously published in Russian, for a wider range of readers, teachers and researchers. The work is devoted to the study of pedagogical technology of professiographic monitoring of the process of formation of the motivational component of professional competence. For experimental work, the study was conducted with the introduction of professiographic monitoring in the educational process of vocational training of naval university cadets in a blended learning environment. Professiographic monitoring is a*

little-studied technology; the result of the work is the definition of its functions, criteria for assessing the level of the motivational component of professional competence.

Keywords: *pedagogical technology, professiographic monitoring, motivational component, professional competence, professional training, higher education, maritime university, cadets.*

Modern state policy emphasizes the need to update and modernize the fleet in all areas, as well as the development of the marine and fishing industries. The Ministry of Science and Higher Education of the Russian Federation emphasizes the importance of high-quality education of students, their training at high standards, so that young professionals have the necessary competencies. In Federal Law No. 273-FZ "On Education in the Russian Federation" of December 29, 2012, education is understood as "a single purposeful process of education and training that is a socially significant good and is carried out in the interests of the individual, family, society and the state, as well as a set of acquired knowledge, skills, values, experience activities and competencies of a certain scope and complexity for the purposes of intellectual, spiritual, moral, creative, physical and (or) professional development of a person, satisfaction of their educational needs and interests" [53, article 2].

When on a flight, crew members and employees of various Russian and foreign services interact, in addition, crew members work with complex equipment, repair it if necessary, and install it to ensure the safety of navigation. Federal Law No. 16-FZ "On Transport Security" of February 9, 2007 regulates "the subject of transport infrastructure, the carrier has the right to impose duties on the personnel (crew) of vehicles to ensure the transport security of the vehicle to the extent that it does not interfere with the performance of official duties of personnel related to ensuring the safety of transportation" [52, article 4, item 4].

In previous studies [23–32; 40–43; 46; 61], the definition of the term "professiographic monitoring" was expanded and clarified in relation to the process of forming the motivational component of professional competence of cadets of a maritime uni-

versity in a blended training environment. The professional activity of marine specialists is regulated by a number of regulatory documents and legal acts, international agreements [60] and conventions [35], laws of the Russian Federation, and during professional training it is also necessary to take into account the requirements of federal state educational standards (FSSES) and professional standards [14].

Taking into account the special specifics of working on ships, ship-owners want to employ highly qualified and, most importantly, motivated specialists with the appropriate level of professional training, striving for self-development, constant updating of professional knowledge, possessing responsibility, determination, and an understanding of the value of their professional activities.

Therefore, it can be concluded that upon graduation from a maritime university, a graduate must have the professional competence necessary to solve all issues and problems related to ensuring the safety of navigation and performing their official duties. It should be taken into account that during the entire period of training, cadets have motives that strongly or weakly affect the desire to learn, the desire to realize themselves in the profession, etc. In the course of training, it is necessary to form positive educational and professional motivations, as they will encourage cadets to improve their professional competence, which as a result will make them more popular in the labor market.

In his work, A.A. Bodalev writes: "true professionalism is always associated with a strong and stable motivational sphere for carrying out a certain professional activity and achieving a unique, extraordinary result in it" [5]. Modern higher education is based on the implementation of a competence-based approach in the process of professional training, and motivation is one of the basic components of professional competence, which makes the problem of forming the motivational component of professional competence of cadets of a maritime university in a blended training environment extremely important and relevant, since the more positive the educational and professional motivation, the higher the level of it will have a motivational component, and therefore training will be more successful and effective. "If the motives of positive content prevail, then all forces will be directed to overcoming difficulties, if not, the

student will become passive" [19]. Motivation, the formation of motives for mastering the profession can be considered as "a regulator of personal behavior that makes it possible to model a professional development strategy" [11] and "the process of interiorization of norms, goals, values of professional activity, the criterion of which is the acceptance of the profession by the individual" [11].

The findings of a research among students enrolled in the field of study 26.05.07 ("Operation of ship electrical equipment and automation equipment"), which is focused on the operation of ship electrical equipment and automation systems, indicate a lack of development in their motivational aspect of professional competence. Specifically, 71.30 percent of participants were found to be merely attending classes to fulfill the minimum requirements set for earning their diplomas. Additionally, slightly more than half, at 52.46 percent, were identified as being motivated to engage in their studies. However, only 37.30 percent exhibited a genuine dedication to mastering their chosen profession [40–43].

Considering the stipulations of the aforementioned documents and standards, upon conducting an analysis of the scholarly literature in the realm of pedagogy, specifically focusing on the organization of the educational process within the framework of blended learning and professional training for naval academy cadets, it has become evident that there exists a discrepancy between the demands for cultivating highly skilled and motivated professionals at a maritime academy and the inadequate level of motivation within the professional competency of naval academy students in a blended learning setting.

The focus of this study is on the educational process implemented in a blended learning context, which aims to foster the development of the motivational aspect of professional competency among the cadets at the maritime academy. The specific subject of investigation is the professiographic monitoring of how the motivational dimension of professional competence is shaped among naval academy students during their blended learning experience.

In previous studies [23–32; 40–43; 46; 61], it was established that the formation of the motivational component of professional competence of cadets of a maritime university in conditions of blended training will be effective if professional monitoring is developed and implemented in the educational process as a pedagogical technology within the model of formation of the motivational component of professional competence of cadets of a maritime university in conditions of blended training; criteria for assessing the level of formation of the motivational component and tested tools that allow its diagnosis.

The regulatory framework of the study includes: legislation of the Russian Federation; Federal State Educational Standard for the specialties "Operation of ship electrical equipment and automation equipment" (approved by Order No. 193 of the Ministry of Education and Science of the Russian Federation dated March 15, 2018) and "Operation of Ship power Plants" (approved by order of the Ministry of Education and Science of the Russian Federation dated March 15, 2018 No. 192); professional standards «Ship's Electrician» (approved by Order No. 331n of the Ministry of Labor and Social Protection of the Russian Federation dated June 15, 2020) and "Ship's Mechanic" (approved by Order No. 576n of the Ministry of Labor and Social Protection of the Russian Federation dated September 7, 2020); regulatory legal acts of the Russian Federation, international rules and conventions governing the safety of navigation.

In the course of our experimental work, we employed a combination of theoretical and empirical approaches, including questionnaire surveys, interviews, pedagogical experiments, observations, and evaluations. Through the meticulous analysis of the data collected, we identified the levels at which the motivational aspect of the professional competency among cadets at the maritime university is developed. Furthermore, we compared the results obtained from the initial and final assessments in both the experimental and control groups.

This research allowed us to develop and test pedagogical strategies for the formation and evaluation of the motivational component in the context of blended learning for cadets at a maritime university. Additionally, we implemented professional

monitoring within the educational process and determined the characteristics and criteria for assessing the levels of development of this component.

The problem of formation of professional competence, methods and principles of formation of marine specialists, structure and technologies of formation of their readiness for future professional activity, the concept of professional competencies are presented in the works [7, 8; 15; 16] and the works of [6; 48; 50] and others. There are a large number of aspects of studying the formation of professional competence, studying its components, both in domestic and foreign research, which includes the study, design of new models, forms, and methods of training, with their testing and inclusion in the professional training process. Foreign theoretical studies of the formation of professional competence [57; 64] are consistent with the works of domestic specialists.

Most studies consider ways of forming competencies [36; 37], as well as tools to assess the correspondence of real learning outcomes to those that were set [47], in other words, the quality of education. Various methods are used to assess the quality of education, of which monitoring can be distinguished. His work is devoted to his opportunities in pedagogy and in the educational system [1, 2; 12; 18; 38; 55]. In 2002, a new term was formulated that defined a special type of pedagogical monitoring – professiographic monitoring [44, 45]. Analyzing the research, over the past years, not even one has been found that examines this type of monitoring in detail or its possibilities for use in the pedagogical practice of maritime universities.

Thus, the topic of the formation of professional competence, as well as the possibility of using monitoring in the pedagogical process, are widely considered in the research of domestic and foreign specialists. Nonetheless, it is worth noting that there has been a dearth of research on the potential of employing professiographic monitoring as an educational tool that contributes to cultivating and assessing the motivational aspect of professional competency among students pursuing marine specializations at universities in a hybrid-learning environment.

A graduate from a maritime university is expected to be a proficient and highly skilled professional ready for their future work at sea, a vocation that entails a significant degree of accountability, as well as elevated risks. They must continuously strive

for personal growth and engage in self-directed learning. However, the conditions of the Federal State Educational Standard pay great attention to professional competencies, without affecting the motivational component of professional competence. Having conducted an analysis of the available research and the requirements in the field of professional training for marine specialists, we have arrived at the conclusion that maritime universities lack a pedagogical methodology for evaluating the dynamics of motivation development, taking into consideration the digital transformation of higher education and the necessity of training highly qualified personnel for work in the marine industry.

The development of the motivational aspect is significantly influenced by educational and vocational motivation, which serves as an impetus for cadets to pursue their objectives in their academic and professional pursuits. The motivational component itself is comprised of a multifaceted array of interconnected elements, including value-based, personal, cognitive, and professional aspects, which undergo dynamic transformations in response to both external influences and the internal state of the individual. It is advisable to carry out diagnostics of assessments and the level of the motivational component, taking into account changes in all the above components, which makes it possible to make a set of diagnostic tools: questionnaires, surveys, tests, etc. In [7], it is stated that the set of criteria «diagnostic test allows you to assess the personal quality of the student, affecting his competence, or any aspect of his professional training», that is, the level of the motivational component will affect the quality of professional training of the cadet, on his professional competence. This thesis is confirmed by the works of domestic [4; 17; 20; 39] and foreign [56–59; 62–64] researchers.

Diagnostic methods are based on testing and questionnaire tools, since questionnaires allow, "collecting a substantial amount of data in a relatively short period of time" [36], and testing allows, "assessing the student's personal quality that affects his competence" [9], which is also consistent with the experience of foreign researchers [63].

The Federal State Educational Standard and educational programs [33, 34] regulate that cadets should have universal (UC), general professional (OPK) competencies,

in particular: UC-1: Is able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy, UC-2: Is able to manage a project at all stages its life cycle; OPK-1 is able to carry out professional activities taking into account economic, environmental, social and legal restrictions, OPK-2: Is able to apply natural science and general engineering knowledge, analytical methods in professional activities, OPK-3 is able to conduct measurements and observations, process and present experimental data, OPK-4 is able to adapt to changing conditions of ship activity, setting priorities for achieving the goal, taking into account the time limit.

Based on the above, we conclude that after graduation, future marine specialists should not only have a wide range of knowledge, responsibility, but also the desire to gain new knowledge, solve problems and tasks that arise in the course of professional activity. The requirements of the Federal State Educational Standard relate to the professional sphere, but for successful training and development of a highly qualified specialist with professional competence, it is necessary to pay attention to the motivational component of professional competence in the course of professional training.

In our pedagogical approach to assessing the motivational aspect, which we define as professiographic monitoring, we conceptualize the content of motivation within the framework of four distinct dimensions: value-based, personal, cognitive, and professional. This approach is informed by the methodological framework developed by T. I. Ilina, titled "Motivation in Learning in Higher Education", which emerged from a synthesis of various existing methodologies [17], allows us to conduct a full-fledged diagnosis of all aspects of the content function defined by us, since it contains three scales: "acquiring knowledge", "mastering a profession", "obtaining a diploma", which can be used to assess curiosity, the desire to acquire new knowledge, including professional ones; the formation of professional qualities; a formal attitude to the educational process. These three scales help us to assess the level of the motivational component, since the diagnostics of educational and professional motivation in the personal-value, cognitive and professional areas is carried out, thereby allowing us to talk about the level of the motivational component of professional competence. For our study, some questions were corrected without changing their meaning.

In a previous investigation, we proposed criteria for evaluating the level of the motivational aspect of professional competence among students at a maritime university. We delineated the characteristics of three distinct levels – high, medium, and low – and explored their manifestations among students. Additionally, we contemplated the implications of fostering the motivational dimension of professional competency among maritime university students.

The experimental study was carried out in three stages: ascertaining, forming and control. The total number of respondents was 285 cadets.

At the ascertaining stage (2019–2021), two groups of cadets were selected, studying under the program 26.05.07 "Operation of ship electrical equipment and automation equipment": experimental (15 people) and control (20 people). In both groups, the indicator of motivation to study was at an average level, a weak desire to master professional skills, and a high level of formal attitude to the educational process.

All these findings underscored the necessity of implementing a developmental phase of the experiment spanning from 2021 to 2022, with the primary objective being to conduct a comprehensive assessment within the context of a blended learning environment, aimed at fostering the development of a tailored approach to cultivating the motivational aspect of professional competence among cadets at a maritime university. The findings of this study have revealed a positive trajectory in the evolution of educational and professional motivation among the cadets, indicating a promising trajectory for their future development.

The results of professional monitoring revealed a significant increase in motivation to acquire knowledge in the experimental group by 26.59%, while in the control group it increased by only 13.34%. Furthermore, the desire to master one's profession grew by 12% in the experimental group compared to a decrease of 0.5% in the control group.

The formal attitude towards professional training also showed a notable shift, with a decrease of 18% in the experimental group and a decrease of only 3.2% in the control group. The use of the statistical criterion $\chi^2 \approx 7.53$ confirmed that these differences are

not due to random fluctuations but rather reflect a genuine improvement in the experimental conditions.

To validate the efficacy of the professional monitoring employed in our model and corroborate the accuracy of the findings, a follow-up phase of the study was conducted during the period 2022–2023, involving students from the third and fourth years of study in the fields of "Operation of Ship Electrical Equipment and Automation Systems" and "Operation of Ship Power Plants", comprising a total of 196 participants. The data obtained were subjected to analysis.

The results of the experimental work revealed a notable disparity in the level of development of the motivational aspect before and after the completion of the control experiment. The mathematical analysis of the data using the statistical χ^2 test yielded a value of approximately 12.031, indicating that the differences observed in the outcomes of the professional monitoring are not attributable to random error. This finding provides strong support for the initial hypothesis.

Thus, the results of using professiographic monitoring as a pedagogical technology for assessing and forming the motivational component of professional competence showed its positive impact on cadets of a marine university in a blended training environment.

Following the analysis of the tables and charts, it has been determined that there have been changes in the indicators used to assess the level of motivation within the experimental and control groups in terms of their professional competencies. The analysis of data from the experimental group reveals that after the implementation of the experimental activities, educational and professional motivation has significantly increased, thereby exerting a more pronounced influence on the development of the motivational aspect compared to the control group.

The results obtained in the course of our research are consistent with a number of developed models for the formation of competencies and competence of Russian researchers [10; 22; 51]. The proposed pedagogical technology of professional monitoring of the motivational component of the professional competence of cadets of a mar-

itime university in the conditions of blended training complements the research devoted to the formation of professional competence [50], competence [3; 13], student motivation [21], the motivational component of professional development [49] with diagnostics of the levels of competence formation [31] and professional monitoring of professional development. It is also consistent with the foreign works of researchers studying the formation of competencies [44; 4, 5], and is also consistent with foreign works of researchers studying the formation of competencies [5, 4; 64].

The paper presents a model of the formation of the motivational component of professional competence, with the definition of professional monitoring in it, as a pedagogical technology, indicating its structure, which allows you to describe, diagnose, predict, correct and evaluate the process of forming the motivational component of professional competence. In addition, the study complements the methodology of professional education with the possibilities of diagnosing the motivational component of professional competence of cadets of a maritime university, the formation of which is necessary both in the educational activities of future marine specialists and in professional activities (understanding the value of the profession, responsibility, striving for self-development, a wide range of knowledge, including professional ones).

The results of the experimental work show that in the experimental group there was a more significant increase in the level of motivation for educational and professional activities compared to the control group, which indicates the effectiveness of the proposed conditions for the formation of the motivational component of professional competence of cadets in the proposed pedagogical technology of professiographic monitoring among cadets of the specialties "Operation of ship electrical equipment and automation» and «Operation of marine power plants".

The conducted research is not comprehensive, but it allowed us to substantiate the importance and necessity of finding, scientifically substantiating and introducing pedagogical technology into the process of professional training of cadets of a maritime university, which contains tools for assessing and diagnosing the motivational compo-

ment of professional competence, and in the future it will expand the complex of pedagogical conditions and develop new tools for assessing the formation of components of professional competence of cadets of a maritime university.

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