

## INNOVATIVE ASPECTS OF BASIC AND FOREIGN LANGUAGE TRAINING OF MARITIME TRANSPORT SPECIALISTS

### *ASPECTOS INOVADORES DA FORMAÇÃO EM LÍNGUA BÁSICA E ESTRANGEIRA DE ESPECIALISTAS EM TRANSPORTE MARÍTIMO*

### *ASPECTOS INNOVADORES DE LA FORMACIÓN EN LENGUAS BÁSICAS Y EXTRANJERAS DE ESPECIALISTAS EN TRANSPORTE MARÍTIMO*

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**ABSTRACT:** The paper deals with pedagogical innovations related to the basic and foreign language training at Maritime University. The research aims to develop didactic means of training in the context of interactive technologies and the digitalization of maritime education. Considering contradictions between increasing opportunities of distance learning and insufficient development of its didactic support, we highlighted the problem, the subject, and the hypothesis of the study. The results of the experimental training course show that level of training in the experimental group of students is significantly higher than in the control group. The results obtained confirm the research hypothesis that implementing didactic complexes in distance learning format with computer support increases the efficiency of professional competencies and digital literacy skills developing in the course of training.

**KEYWORDS:** Pedagogical innovations. Interactive technologies. Didactic support. Experimental course.

**RESUMO:** O artigo trata das inovações pedagógicas relacionadas à formação básica e de línguas estrangeiras na Universidade Marítima. A pesquisa visa desenvolver meios didáticos de formação no contexto das tecnologias interativas e da digitalização da educação marítima. Considerando as contradições entre o aumento das oportunidades de ensino a distância e o desenvolvimento insuficiente de seu suporte didático, destacamos o problema, o tema e a hipótese do estudo. Os resultados do curso de treinamento experimental mostram que o nível de treinamento no grupo experimental de alunos é significativamente maior do que no grupo controle. Os resultados obtidos confirmam a hipótese de pesquisa de que a implementação de complexos didáticos em formato de ensino a distância com suporte de computador aumenta a eficiência das competências profissionais e habilidades de letramento digital desenvolvidas no curso de formação.

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**PALAVRAS-CHAVE:** *Inovações pedagógicas. Tecnologias interativas. Apoio didático. Curso experimental.*

**RESUMEN:** *El artículo trata sobre las innovaciones pedagógicas relacionadas con la formación básica y de lenguas extranjeras en la Universidad Marítima. La investigación tiene como objetivo desarrollar medios didácticos de formación en el contexto de las tecnologías interactivas y la digitalización de la educación marítima. Considerando las contradicciones entre las crecientes oportunidades de la educación a distancia y el insuficiente desarrollo de su soporte didáctico, destacamos el problema, el tema y la hipótesis del estudio. Los resultados del curso de formación experimental muestran que el nivel de formación en el grupo experimental de estudiantes es significativamente mayor que en el grupo de control. Los resultados obtenidos confirman la hipótesis de investigación de que la implementación de complejos didácticos en formato a distancia con soporte informático aumenta la eficiencia de las competencias profesionales y habilidades de alfabetización digital que se desarrollan en el transcurso de la formación.*

**PALABRAS CLAVE:** *Innovaciones pedagógicas. Tecnologías interactivas. Apoyo didáctico. Curso experimental.*

## Introduction

Reforming the higher maritime education system involves a set of innovations for modernizing and radically improving the development and functioning of all stages of training and self-training of marine specialists. It was noted (TOPILINA, 2008) that pedagogical innovations changing the educational process can be divided into the following categories: basic, improving, and complex. In the education system, the basic innovations are presented as creating new technologies aimed at improving the quality of educational services by using the results of scientific research. Comprehensive innovations may be defined as the product of educational achievements, tested, approved, and introduced in various educational institutions by the teaching staff under the guidance of leading scientists.

Complex innovations are required at all levels of the maritime educational process and, first of all, at the stages of basic and foreign language training as a foundation for forming professional competence and digital literacy of marine specialists. In this connection, there is a need to develop a set of innovations designed to renovate the educational and methodological environment by using modern information technologies and the digitalization of marine education.

The analysis of scientific and pedagogical works of the last decade shows that the process of developing the didactic content of digitalization of higher education can be divided into two main directions in accordance with different approaches: (1) solving the tasks of the

program “Digital Economy of the Russian Federation” in its section “Personnel and Education” (MINISTRY OF DIGITAL DEVELOPMENT, COMMUNICATIONS, AND MASS MEDIA OF THE RUSSIAN FEDERATION, 2019); and (2) developing the theoretical foundations of distance learning. As a part of the first direction, we can mention the research on (1) the improvement of the quality of maritime education in a distance learning format and digital literacy of graduates (EDUTECHCLUB, 2018; MAKASHINA; FAYVISOVICH; TRUSCHENKO, 2017); and (2) the development of professional skills and competencies in accordance with the new triad required by modern employers: the willingness to learn, teamwork skills, achievement motivation (TENISCHEVA; TSYGANKO; KUZNETSOVA, 2020). The second direction involves studies associated with the optimization of distance learning (MARICHEV, 2017), scientific and methodological development, and the use of computer technologies in education (ABDURAZAKOV; GADJIEV; GUSEVA, 2019).

Paying tribute to these studies, we believe that even greater innovative pedagogical reserves supported with educational computer programs may be obtained by integrating these areas with the ideas of establishing fundamentals and professionalization of basic and foreign language academic disciplines. In our research, we tried to connect fundamental subject-specific, foreign language, and professional knowledge with some particular way of organizing students’ cognitive activity in solving professionally-oriented tasks of any academic discipline in the context of digitalization of the educational environment.

However, the analysis of practical pedagogical studies shows that the traditional methods of basic and foreign language training of marine specialists in training sessions are not efficient enough. These methods can hardly be successfully applied to a distance-learning format. So, new effective didactic tools and information technology resources have to be developed to organize students’ cognitive activity in the distance learning mode.

## **Methodology**

It should be noted that despite the irreversibility of the digitalization process of education, traditional pedagogical technologies still predominate in the system of maritime professional training, which cannot fully correspond to new standards and requirements of the dynamically changing marine industry. The use of these technologies when organizing students’ educational activities does not sufficiently contribute to the development of their digital literacy skills, individualization and differentiation of learning, integration of

theoretical preparation, and the formation of practical skills. Thus, contradictions arise (1) between the increasing opportunities of the distance learning format and inadequate development of its didactic support; and (2) between the requirement to increase digital literacy and professional competence of a marine specialist and insufficiently modern forms of computer support for the educational process.

Taking into account these contradictions, we identified a research problem, which is to find out what set of didactic tools and resources should be developed for basic and foreign language disciplines to improve the quality of digital and professional training of personnel in the maritime industry. The research objective is to solve the problem described above.

Hence it is crucial to revise technological support of educational process and teaching methods and change the priorities in training. This need determines the research subject: a complex of didactic tools and resources with electronic support aimed at renovating basic and foreign language training of marine specialists as a means of fulfilling their professional and personal potential.

The research hypothesis is as follows: forming digital literacy and professional competence of a marine specialist at the stage of basic and foreign language training by integrating fundamental and professional components will be more efficient if the complex of didactic tools and resources is developed on the principles of systemic-activity and contextual approaches along with the use of interactive pedagogical and digital technologies.

The scientific novelty of the research lies in updating the didactic tools and resources of basic and foreign language training at the Maritime University during the integration of fundamental academic, foreign language, and professional components of education. This process should be based on digitalization and the use of interactive pedagogical technologies, which determines new trends in interdisciplinary synthesis to identify the needs of consumers of fundamental knowledge in the modern maritime labor market.

In accordance with the problem, subject, and hypothesis of the research, the following objectives were set:

- Generalize and evaluate traditional approaches to developing didactic support of academic disciplines of basic and foreign language cycles in the context of their process of fundamentalization and professionalization;
- Develop and substantiate a complex of didactic facilities and resources to ensure integration of fundamental and professional components in distance learning format, individualization and differentiation of training, and operational diagnostics of educational experiment results;

- Design the technology for using the complex of didactic facilities and resources in the context of digitalization of the educational process.

The research methodology is based on the systemic-activity and contextual approaches and the ideas of the dialectical unity of fundamentalization and professionalization of the content of academic disciplines in basic and foreign language cycles (RESHETOVA, 2002; VERBITSKIY, 2017).

In theoretical terms, the study is based on the following aspects:

- Analysis of the logical and methodological principles of the content and structure of textbooks (BALYAEVA; KHVINGIYA, 2010);
- Scientific principles of developing information models of an academic discipline (BAGINA; BALYAEVA, 2017);
- Conceptual basis of certification and creation of a database to support the educational process in electronic mode (KONDRATJEV; BORAN-KESHISHJAN; TOMILIN, 2019);
- Results of scientific works addressing the structure and functions of didactic means and resources (BALYAEVA, 2020; TOKMAZOV; BALYAEVA; PANKINA, 2017).

In this study, the didactic provision of an academic discipline is presented as a complex of didactic means, including material products (educational and methodological materials, technical facilities, etc.), and didactic resources, comprising intellectual products (principles, methods, technologies, etc.), ensuring the development and implementation of the educational process. As the main didactic resources of the educational environment, one can distinguish motivational, methodological, technological, and informational resources (BALYAEVA, 2020).

Thus, the main emphasis in our research is on the development of information and technological resources based on the principle of the dialectical unity of fundamentalization and professionalization of knowledge in the context of digitalization of the educational process. The experimental curriculum of the academic discipline and its didactic support was carried out within the basic cycle discipline “Physics” and the foreign language cycle discipline “Business English.” The formative experimental training sessions (practical classes, seminars, simulator training, etc.) were organized using interactive technologies.

It should be noted that the interactive approach to the organization of training is based on the psychology of interaction between the teacher and the student as the subjects of the

educational process. At the same time, methods of assimilating knowledge and forming skills are based on creative, productive thinking, and active independent communication of students. In this regard, the educational process should be designed in such a way that the students could learn how to work “in a team” and communicate and interact with each other in a virtual environment. This step will allow students to think critically, analyze the ways to solve the problem and choose the optimal solution based on the corresponding subject-specific and professional information (BOTNARYUK; KALININA, 2018).

When developing the didactic support of formative experimental classes, we used the interpolation of professional functioning elements on the cognitive activity of students. Therefore, modeling of professional functions through subject-specific tasks of the basic and foreign language academic disciplines was to meet the following requirements:

- The model should be simple enough for understanding, give new information, and help improve the efficiency of the cognitive process;
- There should be clear purposefulness of the model and the possibility of its invariance, that is, transforming and modifying, if required due to specific circumstances;
- The model should contribute to the rationalization and self-management of educational activities.

We have developed an experimental foreign language course for marine engineers, the structure of which consists of educational elements with the following levels:

- Orienting level containing corresponding subject-specific schemes of the orienting basis of activity [OBA] with a professionally oriented component;
- Formative level including complexes of professionally oriented tasks and situations aimed at achieving the objectives of OBA;
- Evaluating level controlling the formation of OBA and professionally oriented knowledge and skills.

The didactic means of the educational process are supported with a specially developed experimental electronic teaching aid (BALYAEVA; KHVINGIYA, 2010), computer testing programs and video materials.

## **Results and discussion**

The developed objectives of educational activity, experimental electronic teaching aid, training video materials with professionally-oriented content, as well as testing and evaluating programs, allow independently preparing students for formative experimental classes and different types of intermediate control and final attestation. Intermediate control was carried out in practical classes and had a control-correction purpose. The final attestation was conducted on completing the experimental course in the form of a test using computer programs in the distance learning format.

Two groups of 4<sup>th</sup>-year students of the Marine Engineering Department participated in the experiment: an experimental group [EG] of 27 students and a control group [CG] of 26 students. Teaching in the control group was carried out using traditional methodology, but the final attestation was effected in the same way as in the experimental group, in the form of the online test by using computer programs.

Estimation of didactic efficiency of experimental teaching methodology was carried out based on the test results analysis. Each student got an electronic set of 20 tasks comprising three types of professionally oriented situations of foreign language communication. Block A consisted of the situations to check the students' abilities to use professional speech patterns and terminology. Block B contained situations for checking students' knowledge and skills of spoken and written English, which are required in the professional activity of marine engineers. Block C contained the situations with the problematic professionally-oriented tasks and role-playing elements for group work. These tasks included checking the students' teamwork skills and ability to function efficiently in the professional foreign language communication environment.

The results of the test were estimated by the computer program automatically in percentage with the use of a special evaluating scale of successful completion of the experimental course: excellent result – 100% (all answers are correct); good result – 95%–90% (no more than 10% of incorrect answers); satisfactory result – 85%–70% (incorrect answers make up no more than 30%); unsatisfactory result – 65%–5% (incorrect answers make up 35% and more); no answers given – 0%.

According to the results of the final attestation tests, statistical and quality analysis of the answers of the EG and CG students was carried out. Quantitative results of the final attestation of the students from experimental and control groups are presented in Table 1.

**Table 1** – The results of the final attestation tests

Group	20 tasks correct	Correct no more than			No answers given		
		19	17	13			
EG	11	8	7	1		0	
CG	1	4	8	8		5	

Source: Prepared by the authors

The results of the statistical analysis of the test tasks in EG and CG presented in Table 1 show that the level of students' knowledge and skills in the EG is considerably higher than in the CG.

The quality analysis of the final attestation results shows that the knowledge of students of EG and CG has certain quality distinctions. The knowledge of EG students was generalized by integrating fundamental, professional, and digital components of the educational process, while the knowledge of CG students was of fragmentary character. For the analysis of the situations in the test tasks, the students of EG used the information schemes of the OBA, while the approach of the CG students to the analysis of test tasks had chaotic character due to mainly using of trial-and-error method.

Based on the analysis of the results obtained, the experiment showed fairly high efficiency of the developed technology along with the complex of didactic means and resources in a distance learning format at the stages of basic and foreign language training using the integration of the fundamental, professional, and digital components of the educational process. Implementing didactic support complexes of educational disciplines with computer support based on interactive technologies can boost the development of digital literacy and professional competence of a marine specialist and considerably widen the opportunities of integration of theoretical education and practical training of students.

The research results generally comply with the conclusions of our earlier research, which revealed the necessity of developing and implementing innovative didactic means and resources in a distance learning environment aimed at solving the problems of fundamentalization, professionalization, and digitalization of basic and foreign language training (BALYAEVA; UGLOVA, 2016).



## **Conclusion**

The study presents an innovative approach to the renovation of didactic means and resources of basic and foreign language training at the Maritime University, ensuring integration of fundamentalization, professionalization, and digitalization of the educational process, which is interpreted through the concepts of dialectical unity, interpolation, and computerization.

The given research confirmed the initial hypothesis of the study, according to which the increase in the efficiency of the formation of professional competence and digital literacy of marine industry personnel within studying basic and foreign language disciplines can be achieved using didactic support developing based on the principle of unity of fundamentalization and professionalization of knowledge, along with the use of digital and interactive teaching technologies.

In our opinion, the practical significance of the research may be defined by the fact that the technology of the developed complex of didactic means and resources as an integral didactic structure can be successfully applied in distance learning conditions, both within the cycles of basic and foreign language disciplines and in the humanitarian and special educational training.

We believe that our research solved the assigned objectives and unfolded new promising fields for further research. Further studies should be aimed at identifying the content, structure, and principles of functioning of a unified educational and methodological system of higher maritime education in a distance learning format.

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