THE USE OF VIRTUAL SIMULATORS IN THE TRAINING OF ARTILLERY SPECIALISTS

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Abstract. The article examines the application of virtual simulators in the professional training of artillery specialists. It analyzes the potential of virtual modeling for developing practical skills, improving the quality of training, and objectively assessing learning outcomes. The study substantiates the necessity of combining virtual simulators with traditional forms of practical training.

Keywords: virtual simulator, artillery, military education, professional training, digital technologies, virtual modeling.

Introduction. The contemporary development of military education is characterized by the active introduction of digital technologies aimed at increasing the effectiveness of training servicemen and specialists in various military occupations. Virtual modeling and simulation technologies occupy a special place in this process, making it possible to create a controlled digital environment for developing and refining professional skills [1; 2; 3]. For artillery specialists, this direction is of particular importance, since their professional activity requires a high degree of precision, discipline, coordinated action, spatial reasoning, and the ability to process information promptly. A modern artillery specialist must possess not only theoretical knowledge of weapon systems and the principles of their employment, but also the ability to act under time constraints, correctly interpret incoming information, interact with other servicemen, and make well-founded decisions within the framework of an assigned training task [5].

Research Methodology. The methodological basis of the study comprised the systemic, comparative, pedagogical, and functional approaches. The systemic approach made it possible to consider the virtual simulator as a component of the integral system of professional training of artillery specialists, encompassing theoretical, practical, psychological, and technological elements. The comparative approach was used to identify the differences between traditional forms of practical training and instruction employing virtual simulation tools.

Results. The results of the study show that the use of virtual simulators substantially expands the possibilities for practical training of artillery specialists. One of the most significant outcomes is the creation of conditions for repeated practice of professional actions without the constant need to use actual weaponry [4: 98]. In the traditional system of instruction, individual exercises can be performed only a limited number of times owing to organizational, temporal, and logistical constraints. A virtual environment makes it possible to substantially increase the number of repetitions, which is particularly important at the stage of initial skill formation. At the same time, the trainee is able not merely to perform the task but also to immediately see the result of his actions, identify the error made, and repeat the exercise taking the feedback into account.

A significant educational effect is associated with the possibility of modeling various training situations. A virtual simulator can reproduce different conditions for performing a task, vary the parameters of the training situation, and present the trainee with different versions of professional tasks. This helps to avoid the mechanical memorization of a single sequence of actions. Instead, the trainee is

compelled to analyze the changing situation and independently select the appropriate course of action. As a result, not only the operational component of the professional skill is developed, but also the ability to apply the knowledge acquired under changing conditions [7; 8].

At the same time, the results of the study show that a virtual simulator is most effective not as an independent substitute for practical training, but as its preparatory and complementary component. The virtual environment makes it possible to form the correct sequence of actions and prepare the trainee for actual training, but it cannot fully reproduce all the physical, psychological, and organizational features of real professional activity. The optimal model, therefore, is a combined one, in which theoretical preparation is integrated with virtual modeling and subsequently reinforced through practical exercises.

Discussion. The results obtained allow virtual simulators to be regarded as a promising means of modernizing the professional training of artillery specialists. Their main advantage lies in the possibility of transferring a substantial part of initial practical training into a safe, controlled environment. In the traditional training process, an error made by the trainee may require stopping the lesson, providing additional explanation, and reorganizing the exercise. In the virtual environment, the error becomes part of the educational process: it is recorded by the system, analyzed, and used for subsequent correction of actions. This makes it possible to develop in the trainee an attitude toward error not as a final negative outcome, but as a source of information for improving professional skill.

In addition, the problem of the realism of modeling must be taken into account. The more complex the professional activity, the more difficult it is to reproduce in a virtual environment. A virtual simulator can quite effectively model the informational and visual components of an activity, but the physical sensations, actual equipment characteristics, environmental effects, and other factors can be reproduced only to a limited extent. Consequently, excessive reliance solely on virtual training may create a certain gap between the successful completion of a digital scenario and the actual performance of a professional task. It is precisely for this reason that virtual technologies must be used in combination with practical exercises.

A promising direction is the integration of virtual simulators with learning management systems. In this case, the results of each training session can be stored in the trainee's individual digital profile, making it possible to track the dynamics of his training throughout the entire course of instruction. The instructor gains the ability to see not only the final result but also the nature of typical errors, the pace at which the material is mastered, and the need for additional training. Such an approach creates the preconditions for personalizing instruction and for a more rational allocation of training time.

Conclusion. Thus, the use of virtual simulators in the training of artillery specialists is one of the promising directions in the digital transformation of military education. Their use makes it possible to expand the possibilities for practical training, ensure the repeated performance of training tasks, model diverse professional situations, organize the objective recording of results, and increase trainees' independence. Virtual technologies acquire particular importance at the initial stages of professional training, when it is necessary to form basic concepts and stable action algorithms before proceeding to more complex practical exercises.

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