SOME RESULTS OF THE STUDY ON THE DIDACTIC DESIGN OF ENGINEERING TRAINING IN MILITARY HIGHER EDUCATION

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This thesis presents the main considerations of the research conducted on the topic of didactic design of engineering training in military higher education. In modern times, technological innovations and security challenges make it necessary to provide engineering training with new approaches. In this context, didactic design plays an important role in terms of systematization and increasing the effectiveness of the teaching-learning process [1]. The formation of scientific and technical knowledge of engineering-qualified educators and students in military higher education institutions is important for the successful implementation of military operations. In this regard, didactic design of training creates conditions for the purposeful and systematic organization of engineering training [2]. The aim of the research is to build an effective teaching model taking into account military technical requirements, along with pedagogical approaches. Engineering training in the education system is based on the synthesis of pedagogical theories and practical approaches. Classical didactic models are being revised in order to increase the activity and practical skills of learners [3]. Engineering training in a military educational environment is closely related to the development of strategic thinking and decision-making abilities [4]. International experiences show that the constructivist approach strengthens the skills of cadets to think independently and work in a team [5]. An effective learning model is formed by purposeful design and includes the goals, content, methods and assessment criteria of the educational process. The acquisition of skills by trainees in accordance with the real operational environment is supported by digital simulations and interactive teaching tools. Phased planning of teaching and differential approaches ensure adaptation to different levels. The designed model targets the development of both technical and strategic competencies. The research applied a mixed methodology, and both quantitative and qualitative data were collected. Participants' opinions on teaching methods and content structure were studied through structured surveys, focus groups and interviews. A content analysis of the curricula was conducted to analyze the relevance of didactic elements, and the data were analyzed in the SPSS program. Studies show that engineering training should not be limited to the transfer of technical knowledge only, but should be based on a complex model that combines strategic goals and practical skills [6]. Mixed methodology allows focusing on the needs of trainees and modernizing the strategies of the teaching staff. Currently, the training of engineer officers is carried out in stages, but the content of some subjects does not fully comply with modern technological developments and additional training is needed. Other studies show that curricula give priority to theory rather than practice; the application of modern training technologies and equipment is

limited; and assessment criteria do not fully cover real professional skills [7]. In the experience of NATO countries, simulation centers, project-based learning, and field experience are key components in engineer training [8-10]. In general, the limitation of innovative and technological approaches, the weakness of practical skills, and the lack of professional development opportunities for teaching staff are noted as the main problems.

Some statistical analyses and scientific results conducted on the evaluation of the subject of engineering training at the Military Institute

Within the framework of the study, extensive statistical analyses were conducted based on the opinions of cadets and graduates in order to evaluate the effectiveness of the subject of "Engineering Training" at the military higher education institution. These analyses were aimed at identifying the relationships and structural patterns between the respondents' subject choices, attitudes towards teaching methods, and suggestions for improvement.

At the initial stage, descriptive statistical methods were applied to analyze the demographic indicators of the respondents, their levels of interest in the subject, and their general learning experiences. This stage allowed us to present an overall picture of the educational process.

Then, the correlation and relationship levels between various variables were examined through bivariate analyses. For example, the relationship between the attitude of cadets to teaching methods and their choice of subject was evaluated using Spearman and Pearson correlation coefficients.

In a more in-depth phase of the study, multivariate analyses were applied, and the relationship of respondents' suggestions with structured and systematic thinking patterns was investigated through factor analysis and regression models. This approach allowed for a comprehensive assessment of the didactic and methodological aspects of the engineering training subject.

The results obtained showed that the vast majority of respondents consider it important to have a practical orientation of the subject content, to apply simulation-based training methods, and to strengthen interdisciplinary integration. At the same time, it is required that the assessment criteria be more multidimensional and skill-based.

These results support the main objective of the study and prove that the approaches of cadets and graduates in the subject "Engineering training" are formed by scientifically based, structured, and systematic thinking.

The study provides important recommendations from both theoretical and practical perspectives.

Key stages of didactic design in military engineering education

Didactic design serves as a fundamental methodological framework for organizing the training process in military engineering education in a purposeful, systematic, and functional manner. This approach plays a critical role in structuring the instructional process, optimizing content, and fostering the development of learners' competencies. It encompasses the following key stages:

Defining educational objectives - The educational objective forms the cornerstone of didactic design and guides all stages of the instructional process. In military engineering education, the objective should extend beyond the transmission of theoretical knowledge to include the development of cadets' decision-making abilities under operational conditions, management of technical systems, application of safety protocols, and strategic thinking skills. At this stage, Bloom's taxonomy and competency-based learning models should be considered to articulate objectives across behavioral, cognitive, and skill-based dimensions.

Selection and structuring of content - Instructional content must be aligned with the specific requirements of the engineering discipline. It is essential that the content be scientifically grounded, current, and application-oriented. Technical knowledge, tactical and strategic approaches, military safety, logistics, and operational planning modules should be organized in a coherent and integrative manner. During content structuring, models such as integrated curriculum frameworks or modular teaching approaches may be employed to facilitate progressive deepening of knowledge.

Selection of teaching methods and tools - Teaching methods should be selected based on learners' needs, instructional goals, and the complexity of the subject matter. Approaches such as Problem-Based Learning (PBL), simulation-based instruction, project-oriented learning, and interdisciplinary integration have proven effective in military engineering education. These methods enhance cadets' analytical thinking, agile decision-making, and teamwork capabilities. Additionally, instructional tools-including digital platforms, interactive simulators, and virtual reality technologies-enable the imitation of real combat scenarios and promote the practical application of theoretical knowledge.

Development of assessment criteria - Assessment must ensure objective and multidimensional evaluation of learning outcomes. Sole reliance on test-based assessment is insufficient to capture learners' complex competencies. Therefore, alternative assessment formats such as project presentations, individual and group-based practical tasks, execution of engineering plans, and expert evaluations should be implemented. A combination of formative and summative assessment strategies allows for continuous monitoring of the instructional process and accurate measurement of final outcomes.

Directions for improvement:

1. Modern training technologies
2. Interdisciplinary integration
3. Practically oriented training
4. Development of teaching staff
5. Modernization of assessment

Results

- Existing curricula partially meet modern challenges, but the theory-practice balance is not optimal.

- Design processes are formal in nature, which reduces the effectiveness of training.

- The choice of training methods is unsystematic and based on individual approaches.
- Assessment criteria do not fully cover complex skills.

Suggestions:

1. Development of modular, project-oriented and interdisciplinary curricula
2. Systematic application of interactive and simulation-based methods
3. Continuous development of teaching staff and access to international experience
4. Updating the assessment system with formative and summative approaches
5. Accurate description of design stages in regulatory documents and preparation of implementation mechanisms

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