

## APPROACHES TO THE AUTOMATION OF MARITIME EDUCATIONAL PROCESSES PLANNING SYSTEM

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**Introduction.** Strategic planning of educational processes in the training of maritime specialists is one of the maritime higher educational institutions main tasks [1]. The peculiarities of this process are that it is necessary to take into account many factors that determine internal and external strategies for the development of maritime transport industry. This feature distinguishes maritime educational institutions from the total number of the higher education system in Ukraine [2]. Due to the complexity and versatility of planning educational processes parallel and sequential stages, it becomes necessary to create an appropriate specialized automated planning system.

**The main material of the study.** Based on the principles of a systematic approach, we will consider the process of planning educational processes focused on final result as a closed system. Consequently, the cyclical algorithm of system will assume an assessment of its effectiveness at all chronological stages. Of course, the resulting assessment of system's performance can ultimately be reduced to the assessment of each individual student [3-6], however, when considering the entire complex of educational tools, the study should have a large-scale approach. At the same time, the mechanisms of influence on the quality the formed qualification knowledge and skills of future maritime specialists are directly concentrated in the activities of educational institution teachers (Fig. 1). Thus, the complexity of building a planning system for education largely depends on the complexly formalized processes of teachers' activities, especially in the context of passing simulator training on automated simulators [7-9].

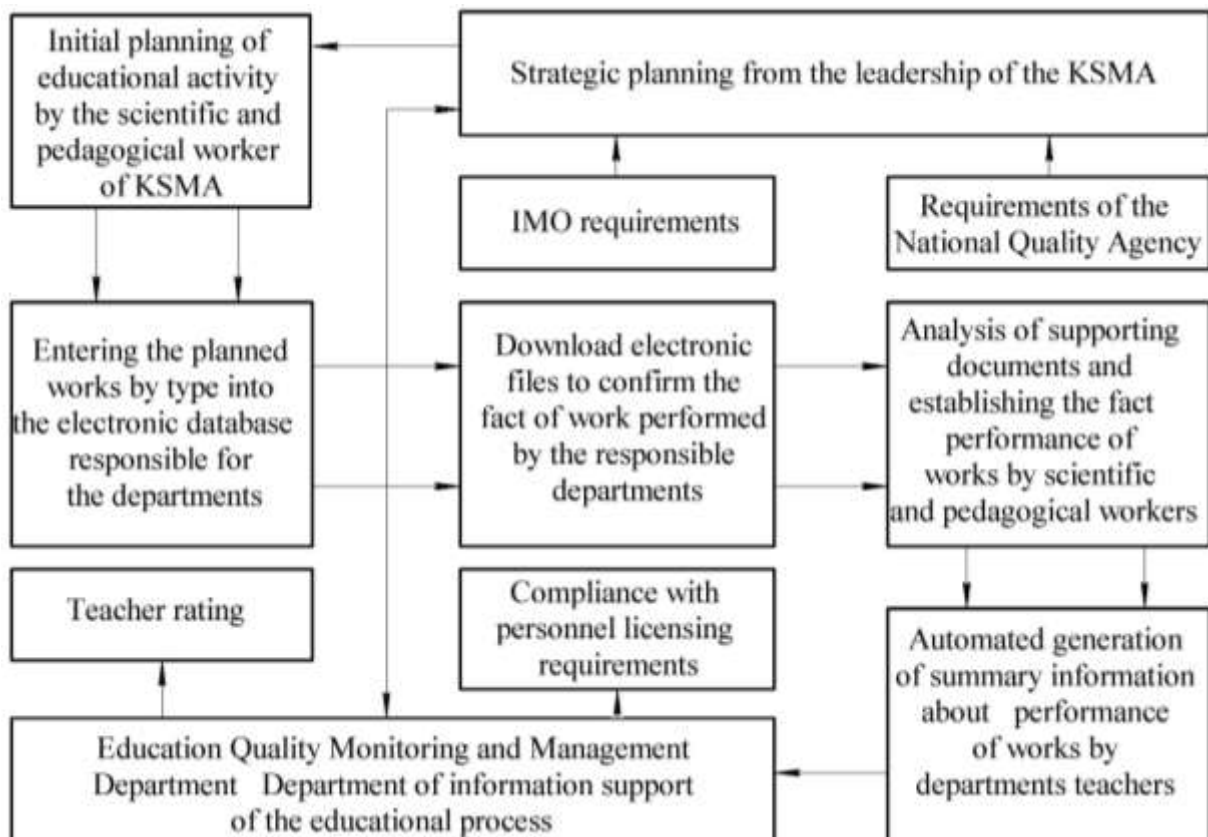


Figure 1 – Information model of planning educational processes

The planning model analysis of educational processes allows us to present its elements in terms of decision-making theory under the influence of the information structure subjects motivation [10]. Then the situational management of the educational processes planning assumes that the subject will be the leadership of the educational institution. At the same time, making management decisions involves a two-tier approach; exogenous, aimed at external government and international maritime organizations; and endogenous, aimed at the teacher.

Based on indicated principles, the subject forms a control action based on the currently accepted utility function  $w^s$  regarding situations  $x \in X$  for which it is true:  $w^s : (Y \times S \times X) \rightarrow R^1$ . Decision-making process can be formalized in the case of using mechanisms and automated tools to determine the current state  $s \in S$  of dynamic planning system. In turn, the decision-making process can be feasible in presence of appropriate structural alternatives  $g \in G$ , and managers  $y \in Y$ , which forms the condition:  $y' \succ y \Leftrightarrow w^s(y', s, x) > w^s(y, s, x)$ .

The expected utility  $y'$  will always be higher than the result of decision making due to presence of stochastic and fuzzy uncertainties due entropy caused by a number to a large number of factors that are difficult to take into account.

To solve this problem, it is proposed to involve the department for monitoring and managing for quality of education in cooperation with the department for information support of the educational process. The work result of these departments within the framework of the model will be direct determination of such  $x_s$  and  $y_s$  for which the utility function will be maximum for a given situation.

Thus, accuracy of diagnosing the state of system determines the effectiveness of decisions made at time  $t_i$ . As a consequence, the formalization and algorithmization of diagnostic processes is of paramount importance and requires an increase in quality, reliability and transparency at all stages of the planning system life cycle. Violation of these processes leads to undesirable risks of the decisions made, which in a dynamic system can be irreversible. The balance of system at each step  $t_i$  will depend on the strategy of not only planning in form of decision-making, but also the strategy of transition to desired state, in which risks are minimal and the utility function is maximal.

Depending on specifics of transition, it is possible to use two different approaches: probabilistic, when the set of states is known a priori, but can vary depending on the diagnosis [11]; fuzzy, in the case when the state is blurry and one can only speak about the belonging of "similarity" to a number of parameters states that are closest in terms. In both cases, the problem of classifying the sets of states  $n$  and their combinations arises  $C_n^m$ , which, with an intuitive approach, can lead to subjectivity. Within the framework of combinatorics, combinations of conditional states can be described:  $C_n^m = \frac{A_n^m}{m!} = \frac{n(n-1)\dots(n-m+1)}{m!}$ , however, this is difficult to implement in practice due to heterogeneity of states and their differences in structure.

All of the above points to an objectively existing technical problem of identifying (recognizing) states, their dynamics by automated means in order to reduce risks and increase utility function of management decisions.

**Conclusion.** Approaches describing the actual scientific and applied problem of educational processes planning automation in a maritime higher educational institution are considered on the example of the Kherson State Maritime Academy (Ukraine). Within the framework of study, the main tasks and problems associated with the complexity of formalization and algorithmization the indicated processes. Attention is paid to application of modern decision-making theory and risk theory, the possibility of using probabilistic and fuzzy systems is analyzed. An information model of decision-making is proposed and its main structural elements are described, on which the quality and effectiveness of higher maritime educational institution directly depends strategic planning.

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