Monitoring of the quality of Maritime specialists training 
in the system of Maritime education

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Abstract. Maritime universities are focused on the principal issues of the maritime education, including creation of new competitive image of the merchant shipping industry, its support through scientific and technological development. The result of set tasks first of all depends on quality of training which should guarantee professionalism of specialists working in the branch.

Currently, the need to improve the quality of Maritime education is connected with the rapid development of shipping industry and a number of documents both national and conventional, regulating activities in this field.

The article shows that there are many methods of quality control of the educational process at the Maritime universities, from collecting information on the performance and other indicators set by regulatory documents to complex psychological and pedagogical tests.

It is proved that there is no optimal model of monitoring, which could validly describe different aspects of the quality of the educational process at the Maritime Universities. The issue of criteria of quality in Maritime education is considered; its links with the elaboration of educational standards are shown and grounded.

The method of monitoring the quality of marine specialists training in the system of Maritime education is submitted. Criteria of the quality of training are highlighted and the mechanism for monitoring the quality of training of future marine specialists is described.

This paper provides theoretical justification to application of the Matrix approach to the construction of the educational space which can contribute much to development of the issue of monitoring and estimation of quality of Maritime specialists training. The theoretical arguments are supported with empirical evidence from the previous research.

Key words: seafarer, quality of training, standardization, maritime transport, maritime university, skill development, educational space, coefficient of comfort.

1. Introduction

Issues of regular monitoring of Maritime education quality are explained by need of scientific and technical progress in professional training of specialists for the Maritime industry. The need to improve the quality of Maritime education currently is associated with the rapid development of merchant shipping and a number of documents regulating activities in this branch. The urgency of considering the issues of improving the quality of professional training of future sea specialists at Maritime universities is obvious. The main contradiction here is the discrepancy between criteria for its (quality) assessment: on the one hand: in any educational institution the main evaluation criterion is volume and quality of knowledge, abilities and skills of the graduate on certain disciplines, on the other hand: the customers of the «product» of the Maritime Universities consider a real readiness of the graduates to the solution of multidimensional tasks while performing the professional activity.

There are some inconsistencies which should be solved. Often professionals with high learning outcomes after graduating from the Maritime institutions, with sufficient engineering knowledge, skills and abilities, are not always able fully to apply knowledge in the professional activity. This is particularly evident in the lack of readiness of young seafarers (and other specialists working in the
Maritime industry) to solve complex professional tasks especially in stressful and unusual circumstances, which often leads to various kinds of accidents. Hence, the cause of much quantity of accidents is the human factor. To some extent, the system of quality of professional training in Maritime universities is urged to resolve this situation.

The essence of the system of quality of professional training at Maritime universities as a pedagogical system is the ratio of activity of participants of education with the pedagogical result. The eternal task (at least, due to the fact that educational standards are constantly changeding owing to development of industry) and require constant attention. Therefore, a system-forming factor of the system of quality of marine specialists' professional training is the goal, determined by demands of consumers of services of Maritime education – by Maritime companies (crewing, shipping, forwarding etc.). The result of wide implementation of this system must reflect the readiness of graduates of Maritime universities to perform complex professional activities and correspond to the requirements of the International Convention STCW 1978/95 and amendments adopted at the Manila Conference, 2010 [5].

2. Monitoring of quality of educational process in Maritime universities

The quality of professional training in the Maritime universities is not only a complex system, but complex systemic object for management or control. Namely, the quality of management of professional training determines the achievement of the objectives of the quality system of professional training and it is subject to appropriate control and regulation of the functioning of all its (the system’s) elements. Orientation of the purpose of quality management of training for the creation of conditions for formation of graduates’ readiness for professional activity determines the appropriate change in its objectives, content, forms and methods of realization of this training. We do not speak about competence assessment or learning outcome of a student to demonstrate his/her capacity to perform tasks listed in the STCW Code. We will focus on one aspect of this issue, on method of control of the educational process quality in Maritime universities, i.e. monitoring.

Monitoring of quality of the educational process means the supervision for its development to ensure optimal choice of tasks, their solutions and used methods while organizing this process. Monitoring involves a systematic diagnosis of qualitative and quantitative characteristics of efficiency of the educational system functioning, and therefore, interaction of all components of the pedagogical system, including direct and feedback among its (system) components.

Currently, there are different methods for monitoring of the quality of the educational process in Maritime universities, from collecting information about students’ performance and other indicators set by regulatory documents to complex psychological and pedagogical tests.

It goes without saying that criteria or indicators under which the quality is assessed should be clear enough, easy to handle, but at the same time it must be grounded on the scientific approach. While estimating quality of education all aspects should be accounted: learning outcomes of students, work of educational institutions and all participants of the educational process. Obviously, there is no optimal model of monitoring, which could reliably classify most aspects of the quality of the educational process in all and in each certain University, including a Maritime University. And this state of affairs only complicates the task of the monitoring.

Maritime education is a special category due to the fact that its realization occurs both on the basis of Federal State Standards and Conventional ones. Maritime education institutions work with increasing independence although it is supposed to work according to STCW Convention. And the Conventional standards and requirements play often a leading role «...each Party shall ensure that an independent evaluation of the knowledge, understanding, skills and competence acquisition and assessment activities...» and «...each Party shall also ensure that an evaluation is periodically undertaken, in accordance with the provisions of section A-I/8 of the STCW Code, by qualified persons who are not themselves involved in the activities concerned. This evaluation shall include all changes to national
regulations and procedures in compliance with the amendments to the Convention and STCW Code…» [5].

As a rule, the monitoring of quality of Maritime education provides the following:

- evaluating the overall goals and objectives of training marine specialists and determination of parameters of this assessment;
- analysis of curricula content of various disciplines, consistent both with national and international standards and the requirements of employers;
- quality assessment of learning resources (textbooks, software products, simulators, etc.);
- the verification of the effectiveness of the used teaching methods and their adjustment and optimization if necessary;
- creation of special agencies, departments, groups, etc. for rapid assessment and analysis of the quality and trends of the educational system both on state level and on level of educational institution;
- development of operational methods for assessing the current quality and its relationship to a model (although, the model is always conditional);
- assessment both of a process of development of professional competences and personal qualities (for example, all-intellectual development, the formation of value orientations, ethnic and cultural competence, etc.) and learning outcomes.

Regardless of what aspects of the educational process will be subject to monitoring, for its implementation it is necessary to ground on certain principles of monitoring arrangement. While implementing the Quality System in Admiral Ushakov Maritime State University (Novorossiysk, Russia) the following principles were developed and introduced:

- the principle of the system arrangement, ensuring the integrity of the construction and the relationship of components included in the monitoring system;
- the binarity principle, reflecting the basic pattern of the effectiveness of the educational systems that is binary (inseparable) combination of teaching and self-learning, education and self-education, external control and self-discipline;
- the principle of management including organization of processes, procedures of measurement, analysis and improvement, as well as the choice of ways to manage the entire monitoring process adequate to the set task;
- the principle of informational activity, which includes collecting information about the learning outcomes of the graduates as the main objective of the management of the quality system, preparation and implementation of decisions on the adjustment of processes (teaching methods, applied aids, pedagogical technologies, etc.);
- the principle of continuity that defines the sequence of changing requirements to knowledge, abilities and skills of learners, the interrelation among the content, methods and forms of educational process;
- the principle of predictability, which is determined primarily by demands of the Maritime Industry, as well as scientific and methodological and financial support of the educational institution.

Reliance on these principles contributes to systematic and profound analysis of the monitoring system.

Typically, monitoring in the Maritime University is carried out in several stages:

- general control of the educational process (education and training);
- evaluation of the shipboard training process and its parameters reflecting, primarily specifics of Maritime activities;
- control of the educational process outcome (both learning outcome and the monitoring of employment of graduates);
- certification of the educational process in general (both by the national bodies, and IMO, different Quality Systems, etc.).

According to results of such monitoring, typically the specific proposals for improving the educational process are submitted and some offers on improving the quality are given.
3. Criteria of quality of Maritime education

The concept «quality» is one of the most difficult one. The interpretation of this concept involves the determination of the list of properties and characteristics, as well as methods of their measurement. These difficulties arise because the category «quality» reflects the great diversity of properties of objects and phenomena.

The concept of «quality» of professional training of seafarers is a large-scale in nature. In conditions of labor market and competition the quality of marine specialists training often influences both the level of production, and human life. Improvement of quality of training is associated with the development of human potential at educational institutions. Moreover, it includes the ability of a graduate to meet current and anticipated requirements of consumers.

However, there is no a unified attitude to the definition of quality in today's educational environment. It is to be noted that the concepts «quality of education» and «training quality» used in the work are not identical.

The concept of «quality of education» often has more formalized content (presence of scientific schools at universities; potential demand for vocational/professional education; financial stability of an educational institution; employability of graduates; qualification of scientific and pedagogical personnel, staffing of libraries, results of scientific and publishing activities, focus of educational programs, international activities, etc.). These and other features are taken into account while assessing the effectiveness of the certain University. However, this information in the framework of modern approach to assessing quality is more likely to be considered for the characterization of capabilities of any University, but is not always able to give an adequate assessment of a result – a level of training of a particular specialist, his/her learning outcome.

The meaning of the term «quality of professional training», involves a greater emphasis on adequacy of results to objectives of educational activities, i.e. readiness of graduates for professional activities in a particular industry, in this case, in the sector of the Merchant Shipping.

The issue of measuring the quality of training causes a lot of disputes. Almost all researchers and practitioners agree on the necessity of search of quality indicators, acceptable for any University. We are sure it is impossible, due to the fact of different directions of educational institutions, different traditions and different culture.

A significant role in this aspect belongs to educational standards, which define the set of competencies, and hence, determine the choice of methods, ways and means of developing these competences. The case with the monitoring of the process of developing these competences is different one. Here again, a number of issues related to the choice of evaluation criteria arises. In this case, the STCW Convention indicates very clearly the required level of competencies of graduates of Maritime educational institutions, but how to assess the formed competence objectively, and what criteria to use? This issue is not fully resolved and it requires further attention. Different authors describe criteria as the essential qualities expected from a graduating student’s performance, i.e. ability to demonstrate and provide evidence of the achievement of learning outcomes. Despite the existing different approaches to the concept “criteria”, its description should contain measurable terms across a range of cultural and performance context. Moreover, the criteria should be explained by a wide number of performance levels that ensure a gradation of the quality of performance.

4. The ratio of the monitoring methodology and coefficient of comfort of educational space of Maritime University

The creation of a normative and methodological base for assessing the quality of professional training is the most important task for any University. Methods of evaluation of graduates training quality should
be grounded on the system and structural analysis, taking into account all the internal opportunities of the University and external factors influencing on its activities.

Any method of monitoring of training quality is subject to the conditions of educational space of the University. In this regard, we propose to consider the coefficient of comfort of educational space of a Maritime University, which measure of conformity is characterized by general condition of all its functional objects.

We would like to point out, that understanding of comfort of educational space of any educational institution in much contributes to quality of education in general and quality of learning outcome of a student in particular. That is why we pay so much attention to it.

Grounding on the statement of M. Heidegger [1], according to which the place is some point of space for existence, arrangements of object in it, we understand «educational space» as conditions for implementation of educational interactivity, which main objective is the changing of objects located in this space.

We’ve distinguished the basic attributes of educational space. They are the following:
- filling of emptiness by material and (or) virtual educational objects;
- prevalence (concerning objects and their quantity) and coherence of educational objects;
- determination of educational objects of space [3; 4].

Educational objects include: the contingent of learners (pupils, students, trainees, etc.), the staff of teachers, state standards of education, educational literature, educational-material resources, hostels, etc. Prevalence of objects is characterized by their «volume» and quantity. Determination of educational objects consists in the following. Each of them has the sphere of existence, the borders, differs from others. Objects of one level of the maintenance consist of objects of another (more concrete, detailed).

We relied on the fact that an applied structure of the educational space of any institution has the characteristics of multi-dimensional matrices. Hence, the orderliness and predictability of the structure component of the educational space is evident. Based on this structure when creating the next level of conditions of educational space, it is possible to predict in advance what conditions, and with what purpose it can or should be created.

Each component while distinguishing and detailed consideration can be decomposed by selection of the characteristic inherent to the components of the next level. This process of constructing of new levels can be continued depending on available information and opportunities to specify the conditions for implementation of educational actions.

We assumed that any quality of a personality is a property of the brain and consists of the actions that it performs. Actions performed by a man on the basis of his «human formation» can be subdivided into two groups. First group includes those which primary purpose is the formation and/or the development of any human feature (knowledge, personality traits...). These are educational actions. Their productivity depends on their adequacy to the set objective. The second group includes all other actions. They are performed to meet the different needs of life, achieve different purposes (cultural, labor, etc.). They also to some extent affect the formation of human features. This effect can be called as natural.

Effective formation of professional competences requires adequate targeted actions. To see it happen, it is necessary to create conditions for them based on specific level of education and capacity to perform necessary actions. These conditions are subdivided into established spontaneously and purposefully created. Actions to develop features of a person are also subdivided into natural and purposeful. The first is considered as socialization, and the last is understood as education. Actions of the educational process are executed in a certain social environment, hence the formation of personality traits is also influenced by the social circumstances.
The foregoing allows conclude, that in the society there are conditions that can be called socialized, and their combination – the «socialized space». It exists together with educational space and intersects with it, as pedagogues use the conditions of social medium for solution of educational tasks. The combination of educational and socialized conditions of formation and development of professional competences can be considered as a space of formation of personal and professional features of a person.

In this development the dominant role is played by an educational institution. It acts under programs based on the national and the international training standards that establish mandatory requirements to the formation and development of competences of future specialists. The space of formation of professional competences must contain the terms (objects), the existence of which allows to each person perform his relevant actions.

In this connection in an educational institution both the educational and social space are created.

The space of formation of professional competences of students in educational institutions may be in a different state of readiness. It is advisable to have a tool for its evaluation allowing reliably track its completeness and state its level. We’ve attempted to create its original image on the basis of our proposed anthropological matrix structure of educational space [2] and index of its comfort [4], characterizing its quantitative readiness.

Developing of the matrix approach to the construction of the educational space-based on solutions of educational targets reveals the prospects of constructing of the objects in this space, the formed level of detailed elaboration, as well as consequent transition to next levels.

Application structure of the educational space of the institution has a symptom of a multidimensional matrix. Hence, the orderliness and predictability of the structure of the educational space is evident. Grounding on this structure when creating the next level of conditions of the educational space in advance, we can predict what conditions for what can or should be created.

Each component when concrete defining and detailed elaborating can be decomposed by highlighting the inherent characteristics to the components of the next level. This process of new levels building can be continued depending on the available information and opportunities to specify the conditions for performing educational actions.

Criteria of readiness of the educational space are: securing of the functional conditions for the development of a person; ensuring an adequate range of conditions for implementation of the educational actions. The degree of correspondence of the educational space to the service of the educational activity is characterized by the ratio of his comfort, which summarizes the status of all of its functional components.

The actual material for evaluation of objects of meaningful matrix can be assembled through a survey, evaluation by experts, questionnaires, inspections of conditions of the considered space (readiness of the institution to solution of the set tasks) or otherwise. It is necessary that the analysis of conditions was continuous (collecting of information about each object) and uniform as possible. We should not expect that the result will be absolutely correct. Its objectivity depends on the experience and expertise of the involved in the research experts, respondents; on understanding the core of educational institution; on provided time to collect information and on many other circumstances.

5. Conclusion

The growth of the ships capacities is obvious and this process is resulted in increasing quality of operability, bringing onboard the ship the newest technology and people able to work in these new conditions. The constant development of technology and its implementation onboard ships, requires highly skilled sea specialists to perform complex professional functions. The first step in achievement
of high results is training of future seafarers in maritime institutions where monitoring of the educational process takes one of the most important place.

There is no single model of monitoring which meet the requirements of different universities from different countries. Monitoring establishes not only the uptake of generated knowledge and skills, but also the quality of this assimilation, which is specified by aims of educating process and creates possibilities for the correction of learning process. A record of all proposed parameters significantly complicates the procedure of evaluating the quality of the educational process. This paper suggests that use of the matrix approach to the construction of the educational space can contribute much to development of the issue of monitoring and estimation of quality.

Despite the relativity of the expected results of applying the proposed methodology, its use undoubtedly will help develop the analysis of readiness of the educational institutions to the solution of their tasks. Now in this analysis mapping of individual opinions and impressions prevails, and the suggested method of finding the index of comfort of created space of professional competence formation represents the attempt of the orderly collection and processing of objective information.

References: