Use a good "TOP-DOWN" design to train students' abilities

WU Jianhua, ZHOU Kui, JIN Jianguo, ZHAO Xin, YAO Li
School of Transportation,
Tianjin University of Technology, P.R.China

Abstract

In this paper, the authors would like to introduce the " TOP-DOWN" design for higher maritime education. Regarding how to improve the students' abilities to meet the requirements of the global maritime transport development, we have changed our education plan from teaching the students with the knowledge to train them with their abilities according to the basic abilities that we realized by studying and analyzing the human resource requirements for officers and engineers in the area of global maritime transport of officers and engineers.
Keywords: TOP-DOWN design, training, abilities

1   Introduction

With the rapid developing of global maritime transportation and utilizing of modern updated techniques, the science and technology content of modern ships is becoming more and more advanced. It is the issue for the academy to consider and discuss how to educate senior seafarers who will master modern navigation techniques.

2   Making a good "TOP-DOWN" design

The university is the place where not only students are taught knowledge, but where students' abilities are trained. In the past, the teaching program was designed to mainly focus on teaching knowledge, so the root question is that the aim of the course setup was only for teaching knowledge to the students.

2.1 Problem we are facing

Facing today's rapid development of technology, it was found that while more and more knowledge is taught, the teaching program has to be adjusted continuously and teaching hours have to be increased without any other choice. So we were engaged to adjust the education plan year. Finally we found that we had entered a monstrous circle. How to walk out of this monstrous circle?

2.2 Solution method we found

After studying all the related factors, we reached a joint key point, which is that the academy should adjust its teaching direction from mainly focusing on training students' technique to train their skills and the abilities of continuous study after their college period. So our university carried out a new teaching reform, which focused on a "TOP-DOWN" design. By adopting this new education method, which is an international concept that is very advanced at present, all complex problems will be simplified. To seek blindly on all sub-systems, nearly every one has its own advanced technique, the "TOP-DOWN" design emphasizes on the whole system's capability of the training object. "TOP-DOWN" is a design method, which is aimed to satisfy the top requirement what should be done at the below section, from the top layer to the foundational layer, step by step. Primarily, according to the basic requirement of students' abilities from society, we have to do a "technical orientation" for the students. Then we rearrange the contents of the courses and adjust the teaching hours. Furthermore, we select sub-systems related to the courses, such as capable teachers, suitable teaching materials, experiments, practices and related training of professional skills. Every sub-system is based on: Firstly, it should be enough to meet its requirements. Secondly, it should be optimized as far as possible. Thirdly, enough space should be left to the students for self-study and development. To set up courses and train the students only according to the composition of the teacher will make them as "accumulation" of high technology. The proportion of their knowledge systems will not be satisfied even though their vigour has been wasted and long teaching hours have been taken. In the concept of "TOP-DOWN", teaching is considered as an integrated system, and it is with great importance of how to design this system. The only necessity of reaching a good result is to make an excellent "TOP-DOWN" design. Otherwise, it will bring some troubles, such as teaching quality, talent knowledge system, ability structure, and the management of university's teaching resources and etc. Thus, to prepare the training scheme and the guidance of a teaching plan separately is the guarantee of carrying out the "TOP-DOWN" design.

2.3 Target we are going to reach

The students, or we can say the officers and engineers in the future that is not faraway, should learn and master 3 kinds of abilities within their college period, and we think it should be: strong individual working ability; excellent language

communicative skills and general management ability based on law consciousness. For the individual working ability, we should mainly teach the students how to analyze and solve the real problems themselves by using the knowledge they have learned and related new knowledge by self-study. As the developing speed of modern ship handling skills and ship devices is much faster than that of our teaching materials, at the same time, due to the limitation of teaching hours, teachers' knowledge level and university experiment instruments, it is impossible to make the students learn and master all the knowledge about ships during their university period. So how to make the students hold the ability of self-study and solve problems by using knowledge they have learned should be paid much more attention. For the ability of language communication, the main task is to train the students' ability of collecting all kinds of information and exchanging ideas with other persons. As a characteristic of the maritime industry, officers and engineers should master a foreign language fluently. The language skill is not only for them to collect information more effectively to ensure safe navigation, but also to exchange and communicate conveniently with other officers and engineers who are on board the same ship to form a team to accomplish shipping tasks together, or with personnel ashore or onboard other vessels to ensure the safety of navigation. General management ability is based on law consciousness that refers to do things legally, operate according to operation rules and increase the ability of cooperating with others. As different countries have different cultures, ideas and consciousness, laws are also different from each other, so it is necessary for them to learn and master local law, behaviour, regulations and law. At the same time, they should also learn how to protect their legal rights and interests by using the weapon of law. So the university has to frame its own scientific and logical development programming and to set up its scientific and reasonable "TOP-DOWN" design, which can express modern advanced educational concepts. These are just the basic thoughts to set up the "TOP-DOWN" design for the specialties of maritime transportation.

3 Paying attention on training students' abilities

In order to train students' abilities afore mentioned, we have mainly adjusted and added some education contents as follows:

3.1 Innovation practice training

Adding eligible trainings and practices for our officers and engineers.
Training contents: according to the uniform request by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW78/95) and the regulations worked out by the Ministry of Communication and Maritime Safety Administration of PRC, we have arranged officers and engineers eligible for training courses. The key point is to make them finish the related theory training of maritime functions, cargo handling, stowage function, marine operation management and human resource

management. The training stresses to train the students how to finish related theory study by using the knowledge they have learned at university and though the related knowledge they have self-studied based on the related practices comprehensively. They also need to practice other teaching items which include cargo plan, route planning, and ships in-port and out-port operations, all-weather driving, trouble diagnoses, and accident elimination and so on, on real ships or on the ship simulator.

3.2 Improve students' communication abilities

Adding the training of students with their abilities in language communication emphasizes their ability of collecting and exchanging information. The method is: students should finish two reports in English for language exchanging. The students themselves could select the subject of the first address. The topic could be their daily study and life or science popularization knowledge. The second report should be professional in the maritime field, which introduces new technology and new discovery in detail. The duration of each task is 30 minutes. Besides tasks, students should answer some related questions. In order to accomplish the report above mentioned, students need to collect, select, trim and summarize all the materials related in the library or through the network by themselves. Based on these activities, students can then finish their preparation of their reports and oral defence. Through these, the skill of handling the materials and furthermore the abilities of proper express can be trained, and at last the aim of language ability can be reached.

3.3 Training students independent abilities

Adding the after class science and technology activities. The science and technology activities should enclose the subject of navigation closely. For example, our after class science and technology activities include: researching and manufacturing solar life boat recently, and the network of maritime safety education which students are studying for. Through arranging science and technology activities, students have learned some new knowledge which enclosed the science and technology subjects, especially with the development of solar life boats, the students have not only had a deep understanding of solar energy, but also learned a great deal of professional knowledge which includes shipping lifesaving devices. Another example is that, depending on making maritime safety educational network, students need to analyze the reasons of maritime accident, recover the accident process on the screen and analyze the wrong operation by using ship simulator. Students put their discussion and research results on the network; the students' shipping safety consciousness has been increased rapidly, and so they have supplied a safety warning to navigators. Thanks to the after class science and technology activities, for these have awoken the learning interests of the students, fostered the students with sound study habit, and the most important is, that it is changing the students' ideas from "made me study" passively before to "I want to learn" actively now.

4 Teaching result appears

Ability of self-study and practical problems solving of students have obviously been increased. Ability to collect materials, to gather and summarize information, and ability to communicate in English has obviously been enhanced. Consciousness of law and safety operation of students has also become strong. As an achievement, our university's examination passing rate of national officer and engineer has reached the top in recent years. Summarizing all the statements above, the fundamental goal for us is to forge our maritime transportation education ahead accompanied with the development of science and technology, deliver qualified students to the shipping expresses. To achieve this, the most primary method is ability training upon the "TOP-DOWN" which grasped the whole skeleton. Both analyzing of theories and examples in practices has proved this.

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