Research on the Role of Marine Simulated Engine Room in the Teaching of Higher Vocational Marine Engineering Specialty

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Abstract. In this paper, summarizing the automation of engine room. At the same time existing in Marine engineering technology students learn professional class confusion and facing problems in the teaching process is analyzed, and using the automation of the engine room solution to the problem of professional course teaching ideas are put forward.

Introduction

Marine engine room is designed according to the real environment of the ship's engine room. It has a perfect teaching function, such as selecting the power equipment, optimizing the fuel system, lubricating oil system and cooling water system. The marine engine room can meet cognitive learning of students of Marine Engineering, requiring professional courses, training and testing engineer competency assessment of practical training, which can also provide practical teaching services for related majors, such as ship electrical specialty, ship machine specialty, ship maintenance, etc. At the same time, it can also provide a platform for professional teachers or ship enterprises to upgrade their business level, upgrade their positions and teachers' scientific research. The Simulation engine room, see Figure 1. The engine room simulator is a must-have facility for modern Marine education it is a combination of simulation hardware and software to integrate modern the work of the ship's cabin is more real than ever before. The system can be operated, on-duty and troubleshooting. The whole characteristics of the system are: flexible operation and intuitive teaching, which make student's have an immersive feeling.

Figure 1. The Simulation Engine Room.

The simulator is a large, integrated semi-physical simulation simulator. The ship .The equipment operation and control panel are the same as the actual ship, which is the specialty of the department
Materials, reflecting the basic working principle and basic operation procedure of the ship's power plant; simulation The design adopts two layers of architecture, and the lower plane (bottom layer) adopts PLC architecture and executes Simulate the input and output response and instruction execution, the equipment running simulation mode Type and communicate with PC, PC using the server and PC architecture, main function is to fault simulation, model library to create and run, and lower machine communication, teacher management functions such as workstations, training and assessment. It Can be realized by the host machine operation simulation training and evaluation, the main engine remote control operation simulation training and evaluation, the ship power station operation simulation training and assessment, Marine auxiliary boiler, air compressor, such as operation simulation training and evaluation.[1]

In view of the higher vocational students of marine engineering specialty, it is difficult to carry out cognitive learning in the practice of merchant ship or the real ship of school enterprise cooperation. Restricted by many conditions, such as lack of practice ship, funds, sailing date and so on, it is very difficult to realize cognitive practice. At this point, it is particularly important to equip the marine engine room.

Students of marine engineering specialty have specialized courses in field simulation teaching in marine engine room, such as marine propulsion power plant, ship electrical equipment and system, marine auxiliary equipment, marine machinery automation, ship management, ship electrical, etc. This paper will combine the existing problems in the teaching process of the specialized courses during the three stages, analyzing the function of the automatic engine room in the teaching of specialized courses, and providing the solution to the problem.

The Utilization of Automatic Engine Room before the Teaching of Specialized Courses

Existing problems: most of the students in higher vocational engineering will enter the specialized courses directly after they have completed the specialized basic courses. It is difficulty to understand and remember the professional knowledge, students feel which is scattered, Even professional teachers of rich sea experience from the whole system of marine engine room teach, one by one analysising the knowledge, but it is difficult for students to set up systematic connections between every equipment, not achieving the desired effect of teaching and learning. Due to various reasons constraints, higher vocational students have no real ship the cognitive practice for a period of time as college students before professional course learning, so it is impossible to establish the perceptual knowledge of the shape, location and operation of the engine room equipment, establishing the engine room equipment system. The absorption of students' professional knowledge is affected.

Students can achieve their goals through cognitive practice before they study in a specialized course. (1) be familiar with and understand the working environment of similar ship engine room, obey the discipline of engine room work, and feel the work of future ship; (2) understand the connection, location, basic structure and basic principle of all kinds of mechanical and electrical equipment in the engine room, and get the perceptual knowledge, and lay the foundation for the system to learn the specialized knowledge of the marine engine; (3) simulation on duty and teacher on-site teaching, training the students' basic analysis and problem-solving skills by excluding some of the preset failures and equipment maintenance management to master basic marine management capability.[2]

In order to improve the effect of students' cognitive learning, it is necessary to make full use of the resources of the marine engine room. Firstly, according to the specific equipment of marine engine room, a guide book for cognitive learning of marine engine room will be compiled, as far as possible to simplify the introduction of cognitive mechanical and electrical equipment, not too detailed introduction of the equipment structure, a brief description of its basic structure, working principle, operating procedures and so on. If feasible, the instruction book first systematically introduces the electromechanical equipment of engine room, and then classification design cognitive learning according to the needs of various specialized courses, then using English to mark the name of the
equipment, valves, pipes and so on, providing assistance for later Marine Engineering English Studies.

Secondly, the Double Qualified Teacher teaching and the cognitive learning tasks. The experienced engineer reasonably and effectively explains the cognitive content by combining with simulated engine room and marine experience, to meet the basic knowledge and skills required of students before studying specialized courses, in addition, students are required to complete certain cognitive learning tasks for improving students' interest in learning.

Finally, the effect of cognitive learning is evaluated. Students can not think only cognitive learning process, completing assignments equal to complete cognitive learning, but each group of students on-site assessment in marine automatic engine room, putting pressure on students for achieving good learning effect.

The Utilization of Automatic Engine Room in the Teaching of Specialized Courses

Existing problems: the theory courses are finished and then the actual operations are carried out in the past, in addition, there are some differences between the actual operating equipment of the engine room and the theoretical knowledge and the textbook, The teaching effect of students expected to have professional theoretical knowledge and practical skills is very difficult, and then it is impossible to reach the maritime bureau theoretical test and practical operation assessment requirements.

Before the teaching of specialized courses, the cognitive learning in the marine automation engine room was studied, and the perceptual knowledge of the automatic engine room system and equipment was improved, and the confusion of the students professional knowledge was reduced. However, it is not enough to rely on the cognitive learning of marine engine automation. It is not enough to learn specialized knowledge [3]. Because the engine room will be used as a learning platform, it will deepen the students' understanding of professional knowledge and improve their practical operation ability.

The Integration of Professional Courses

The knowledge of the theoretical part is based on the requirements of the marine administration examination syllabus, comparison and analysis of the requirements of three aspects of automatic engine room equipment, professional textbook knowledge and ship work, integrating of the school's applicable teaching materials, engineer competency practical assessment basing on automatic engine room. Therefore, the training experiment part should be written close to the marine automation engine room equipment and fused with the requirements of the maritime bureau examination syllabus, and assist to join the actual ship experience and examples.

The Field Teaching of Specialized Courses

Individual training operations are achieved in marine automatic engine room according to the professional teaching content needs, compared with the traditional teaching, scene teaching intuitive can deepen the understanding of professional knowledge, better teaching effect received. To carry out field teaching, it is bound to require dual qualified teachers should have a solid professional theoretical knowledge and skilled practical skills, which operating and maintaining equipment in simulated engine room corresponding to the teaching contents for correctly guiding students to practice drills.

Assessment

The students are grouped to practice, each professional course assessment of eligibility requirements, but not simply training on the end, and to the evaluation, which can achieve proficiency training, in fact scores given by, not to continue training re assessment, there are multiple assessment opportunities as the driving test, the purpose is for students to operate. Reduce the pressure for practical competency assessment.[4]
The Utilization of Automatic Engine Room after the Teaching of Specialized Courses

Existing problems: students can make better use of automatic engine room before and during the two stage of study. But students have fewer opportunities to use the automated engine room after studying in specialized courses and before graduation, they forget professional knowledge and practical knowledge to a certain extent, because of the comprehensive competency assessment long time interval training.

The marine simulation engine room has been used in most field teaching, the marine simulation Power station, see Figure 2. Operation and management of the power station. Both can be trained with the entire simulator and can be trained individually. Simulation of the operation of the ship power station: daily operation training; Training of power station protection function. Other emergency starting, chain and switching training.

![Figure 2. The Marine Simulation Power Station.](image)

Comprehensive evaluation training, cognitive learning and other teaching requirements, not opening at ordinary time, which results in the fact that the resources of marine engine automation engine room can not mostly be utilized and no playing the important role of specialized courses after class. Recommended opening marine automatic engine room, which can help the students deeply understand confused professional knowledge and skills, consolidating professional knowledge and practical skills, and enhancing the understanding of professional knowledge, at the same time, it can also provide chance for practical training and scientific research of professional teachers, and improving the utilization ratio of automatic engine room equipment.[5][6]

The simulation of engine room and reasonable updating of equipment and data will help to improve the effectiveness of the simulated engine room after the teaching of specialized courses. The training simulation group is divided into the knowledge frame, See table 1.

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In table 1, for group is Electrical learning team f. There are seven groups of 35 in one class. In table 1, the 1.1 is ship electric drive power system. 1.2 is commonly used appliances, 1.3 is ship electric power system, 1.4 is the ship equipped with power supply and power station. 1.5 is electric power load calculation, 1.6 is power system protection, 1.7 is electric power equipment selection and debugging.

The simulated engine room does not reflect the conditions of the electromechanical equipment as the actual ship's engine room, therefore, through the practice of teachers in the ship, collecting data to update the automatic engine room related equipment work parameters, maintenance, fault diagnosis, etc. the purpose is shorten the student's job time on the board. Adhibiting multimedia in automatic engine room, using computer simulation technology to simulate the equipment for inspiring students' interest in learning and improving their understanding of professional knowledge.

Conclusions

In the course of specialized teaching of marine engineering technology, we should make full use of the resources of the marine engine room and carry out a reasonable design of the teaching process, which can help the engineering technical students solve the puzzle of study, making students master the skills of practical operation and improve their competitive ability in real ship work. The marine engine room plays an important role in training high quality and high tech marine engineer.

Adhibiting multimedia in automatic engine room, using computer simulation technology to simulate the equipment for inspiring students' interest in learning and improving their understanding of professional knowledge.

The purpose is for students to operate. Reduce the pressure for practical competency assessment.

Simulator training is a comprehensive training for students this training is for the machinery, electricity and crew of the Marine management personnel. We will lay a good foundation for the future. The setup of the failure on the simulator It comes in the form of a malfunctioning tree, which is greatly promoted through repeated training High school students' comprehensive operational ability and practical analysis ability. To attend the professional teachers of the practice also cross the contents of the courses Communication. And if you have enough time to train in the simulator, we can also improve our students' sex training in addition to completing three tubes. All equipment and systems of engine room should be equipped with training programs In addition, you can also train the skills of some management officers.

Training combined with each other, complement each other, for the safe, economic and efficient training in line with international standards of applied advanced navigation technology talents to create a good experimental base, for the "mix" of Marine engineering professional practice teaching mode it creates good conditions.

References


