

Application Of Modern Teaching Methods To Study Of Navigation And Marine Engineering Technology

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Abstract

This paper introduces modern teaching methods that are used in maritime technology and marine education in Tianjin University of Technology. Modern teaching methods include multi-media teaching method, cases teaching method, VR (virtual reality) technology application, maritime simulators application, bilingual education in specialty education, academic seminar in school education activity, keeping in touch with International Maritime Safety Authority and Maritime Safety Authority of China, and student science activities. The excellent results are achieved by practice.

Key Words: Application, modern teaching method, study

Foreword

With the development of modern navigation technology more and more navigators and marine engineers are needed. The questions of how to train them as well as our students, how to organize their education and help them to catch up to the demands of modern navigation and marine engineering technology as quickly as possible, have been explored by colleges around the world, and valuable results in many aspects have been obtained. Colleges of the international community conducted beneficial research in many ways and obtained the valuable results. Our school has done the relevant exploration and research into these aspects according to our current equipment and teachers. We also have got good results in the training of the advanced engineers of Chinese navigation and marine technology fields.

Current problem

The Chinese higher education system pays attention to theorization teaching in general, that is embodied in the following aspects:

- 1) The quantity in the theorization courses arrangement is larger, accounting for more than 80% of total teaching hours.
- 2) Results of teaching are tested by theorization examination and the training and testing to their ability of practice are neglected.

- 3) Teachers usually explain the theories, deduce the formula, calculate the example and repeat what the book says. They seldom recommend the worthy reference books to their students. They also infrequently explain and analyze practice examples related to the theory when they teach the students. At the same time, teachers are lack communication with each other, so many overlapping contents in different courses are not being explained clearly and the key contents are difficult for students to master. As a result students, who have no practical experience, are inclined to view the courses as dull and lack motivation to study positively.
- 4) The students are using Chinese examination education mode, so they recite all concepts and formulas before they take part in the examination. They will forget nearly all the things not long after the examination because their knowledge is unilateral and they have not understood the key contents of the courses.

What we do

In view of Chinese education method and our school's practice, in order to help our students adapt to the development of navigation and marine engineering technology and keep up with the level of navigation and marine engineering technology in the world, we have put emphasis on education and teaching work in following areas:

- 1) Employ multi-media teaching method using modern teaching technology. We encourage our teachers to apply the multi-media courseware in their teaching as it can not only explain a greater volume of information to the students in a short time, but it can also solve the problem of out of date books being used. The teachers enrich the contents of the courseware annually according to new technology and application in maritime teaching and ensure that the students learn the latest in technical development and application.
- 2) Because courses in navigation and marine engineering technology include both theory and practice, we adopt case teaching to enrich teaching content, integrate bald theories with navigation practice. At the same, we have adjusted the teaching project. The rate of theory and practice is from 80:20 to 65:35. We have increased some manipulation courses, such as GMDSS, APRA, advanced fire fighting, and so on. Case teaching means explaining the theory according to what has happened in navigation practice so it can attract the eyes and hearts of the students and deepen their comprehension of theories. There is also a lot of practical work for our students. Before the major classes start, our teachers often organize the students to visit the ship factory to learn the equipment. After all the classes are finished, they have chance to practice in the ship to improve their skills for their future work.
- 3) All kinds of maritime simulators used in teaching make possible things that could not be realized in the past. The navigation simulator is used for training navigators. In front of the navigation simulator, we have the feeling that the ship is moving as we are driving it. We can see the fog, clouds, beach and so on, in front of us. It is so vivid in the view of the scene, and has such a broad range of function that students can practice such things as

drawing out the sea route, driving the ship and securing sailors. The engine simulator provides the maritime engineer the chance of practice. It involves almost all of the automatic equipment in the engine room. For instance generation system, main engine system, auxiliary engine system, pipe system. The students can control the engines and learn how to eliminate the fault. These simulators attract the interest of the students and by using these simulators the students learn the skills necessary to control the ship.

- 4) The VR technology is used in teaching. Now we pay more attention to the visual disassembly of ship that designed by CAD. We have finished some parts' disassembly system by software technology. The application of virtual reality disassembly system makes the disassembly work simple and can be grasped easily. There are qualities of equipment in the ship, without the virtual technology, teachers can never show so much equipment's disassembly progress to the students in the class. With the help of the LAN, in the virtual disassembly environment every student can have a computer to practice the disassembly and assembly of the equipment that solves the problem in the past that one played the practice and the others were only audiences. By the virtual disassembly system, the students can not only disassemble the assembly, but also learn its principles and grasp the key contents. And it is important to improve the students' capability to take advantage of their brain and hand.
- 5) In order to improve our students' level of English, we encourage our teachers to put bilingual education into their teaching practice and appoint foreign teachers to teach our students oral English. As the manipulator of an international ocean ship our students will need not only solid professional knowledge, but also a high level of foreign language in order to communicate information and professional knowledge or technology with colleagues, and to understand all kinds of instructions spoken in different accents.
- 6) We develop academic communication work periodically in our school. In order to change teaching contents' singularity, our teachers communicate with each other periodically in academic seminars. Marine technology includes so much integrative knowledge that every teacher needs to introduce his new teaching method or update study to all teachers of the whole school. In this way, our teachers could keep on with their own study, as well as exchange and/or share their research achievements with others. And we can effectively avoid the problem of teaching content not being connective across our courses.
- 7) We have paid a close attention to strengthening contact with relevant navigation schools around the world, with a view to enhancing academic communication. In order to master updated technology and knowledge, we take an active part in translating and sorting relevant international navigation profession education or training information that is published by the International Maritime Safety Authority, the Maritime Safety Authority of China and local MSA of Tianjin. We implement our teaching quality guideline, putting a teaching quality control and evaluation system into practice. By means of communication, we continuously study others' education methods to improve our education level. We pay much attention to education, improve the students' responsibility to the career and help them to become qualified for their jobs.

- 8) We organize and guide our students to participate in science activities that are relevant to their professional knowledge, and will enrich their lives after class. One of the students' science activities that we organized last year was the solar energy lifeboat concept design. Around this theme, students studied about the solar energy principle and solar energy battery board themselves. Students combined the new knowledge with the knowledge of body craftwork, hydrodynamics, ship design and so on what they have learned in the classroom. They finished the drawing design and modeling design with the help of their tutor. The solar energy lifeboat was awarded the bronze prize in the national competition of all undergraduates with "Challenge Cup" in 2002. This activity inspired students' positivity.

Practice's results

Through these practices over the last few years, we have acquired many benefits that can be embodied in the following:

- 1) Our students attended the "seaman qualification certificate" that is organized by the Ministry of Communications of the People's Republic of China and came out top of the relevant national colleges in the percentage of passed students.
- 2) Our students' employment percentage, including the percentage of those that passed the entrance exam of graduated students, kept on 100 percent, which was more than other schools of our university.
- 3) The percentage of qualifier is higher. Our school's spot check of 62 graduates showed: the percentage of those who were employed or entered for entrance exam of graduate student and passed was 100 percent. Of the 14 graduates who are engaged by an enterprise, 10 graduates passed the international famous ship-owner' written examination and interview, and got better grades.
- 4) The students of our school have such a strong dependability and such good achievement in the job that our school has received a lot of good feedback from their companies. The relevant companies plan to employ more students from our school in the next year.

Conclusion

Navigation and marine engineering specialty attach importance to both theory and practice. You can even say that they are related to safety of life at sea and pollution from ships. So we must build up students' commitment to ocean shipping, make them take an active part in their education through a progressive teaching process, enabling them to feel that they have benefited from the education in the end. In the last few years we have achieved a good deal by the application of modern teaching methods. With the development of technology and the improvement of education level, we are confident that we can do even better in the future.

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