Application Research of Information Technology Teaching Methods in Marine Engineering Technology Based on Internet+

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ABSTRACT

In the traditional education mode, Internet technology has long been implanted into the classroom, but in the early days, there is “Education+ Internet” mode with the traditional teaching mode dominant and Internet technology complementary. With the development of network technology, “Internet + Education” mode comes into existence which is dominated by Internet thinking, overturning the traditional teaching mode, teaching subject and operation ideas. The paper takes Marine Engineering Technology major of Tianjin Maritime College for example, carries out a discussion about “Internet+” education teaching mode of Main Propulsion Power Plant course. Applying WeChat teaching platform, E-Learning simulator simulation teaching platform and intelligent information means, to reintegrate classroom, build a new teaching system, and train professionals of Marine Engineering Technology in conformity with the international conventions under the new era.

KEYWORDS

Internet+; WeChat; E-Learning simulator; intelligent classroom; Marine engineering.

INTRODUCTION

In November 2013, for the first time, the third plenary session of the communist party of China wrote education informatization to “The CPC Central Committee Deepen the Reform of Several Major Issues Decision”, and emphasized to take education informatization as the important indicators of education modernization index system. In March 2015, Prime Minister Li Keqiang first proposed “Internet+” action plan when doing the government work report on the 12th National People’s Congress Third Meeting. In July of the same year, the state council formally promulgated “Guidelines about Promoting “Internet+” Action”. The newly issued series of documents pointed out a developing direction for education informatization and "Internet+ Education". "Internet+ Education" brought about improvement for the ecological environment of college education, coruscated new vitality for the traditional education, and brought new opportunity for college education teaching development. But in "Internet +" environment, how to realize a teaching reform to make the education quality in colleges and universities ascend better and faster is worth the thinking of each college educational worker.
CURRENT SITUATION OF MARINE ENGINEERING TECHNOLOGY

Marine engineering technology major is dedicated to cultivating professional technical management personnel of ship electrical and mechanical equipment for ocean transportation. But over the years, the development of shipping technology talents has failed to keep pace with the development of shipping industry, and there is global lack of professional and technical shipping personnel. According to the latest statistics of The Baltic and International Maritime Council BIMCO, the international crew manning exporting countries include: the Philippines accounted for 28.1% of international crew labor market, Russia (6.8%), India (5%), and eastern Europe (16.6%), while China, whose population ranks first in the world, accounts for only 6.2% though its international crew labor export market share is raised to the third. In order to adapt to the shipping development, on June 21, 2010, the international maritime organization (IMO) held a diplomatic conference in Manila in the Philippines, modified and approved STCW78 convention and its affiliated rules (hereinafter referred to as Manila STCW78 convention 2010 amendment). The new conventions and regulations have come into effect, which put forward many new requirements for marine engineering technology professional training and teaching. It is a new development opportunity and also a challenge to promote professional construction and development of marine engineering technology. Under the new convention, how to apply information technology means, to improve students’ theoretical knowledge and the ability to practice has become a developing goal.

THE APPLICATION OF “INTERNET+ MEANS”

Under the environment of “Internet+” “learner-centeredness” was advocated, the leading position of teachers in the teaching activity changed from “teaching” to “guide learning”, the role of teacher changed from preaching, teaching, and solving to the learner’s guide, staff, designer, collaborator, promoter and motivator, etc. Teachers should think about how to put “information” into “knowledge” and “Intelligence” into “wisdom”. Teachers should even more pay attention to the cultivation of the student’s application ability and innovation ability. Therefore, teachers need a higher level of education teaching ability, be familiar with modern education technology, sufficient study all aspects of teaching to adapt to the education demand of new “Internet +” environment

WECHAT TEACHING PLATFORM

Along with the development and promotion of informatization teaching in universities, most colleges and universities have established information teaching resource database such as high-quality course resources sharing sites, various curriculum courseware database and examination database. In addition, part of the platform website resources can automatically transfer computer web pages into mobile browsing size according to the user’s device. Therefore, this kind of platform can directly set the electronic document site links on the existing curriculum resources website such as PPT, electronic materials, problem sets, etc. to WeChat platform by
means of keywords replying, custom menus, etc. so that the students can be directly in
the mobile phone WeChat browsing study, meeting the needs of mobile learning.

In addition, on basis of browsing according to the classification of resource type, we
added small bundles of modularization classified as per sections, so that the student
users can directly reply chapter on WeChat platform, for example, replying “quarter 1,
chapter 9” can easily browse the resources of test analysis, curriculum, curriculum PPT,
exercises online, etc. of the chapter.

At present, the existing shared course websites in most colleges and universities
including our Tianjin Maritime College do not have the size of mobile browsing. If the
students use mobile phone browsing web resources directly, there will be a problem
such as dislocation, messy code, etc., so the group adopted the following two ways to
transform the resources of browsing size, for student users to use easily:

(1) Upload resources like teaching materials, teaching plans and exercises to library
platform like Baidu Library and Road passenger baba. Since most of the current library
websites support that library resources are automatically converted into mobile viewing
sizes, so people can directly upload course of these resources to library website platform,
then with auto reply the generated site connection into WeChat platform.

(2) Resources such as PPT made into H5 web pages. Majority of navigational
technology professional courses are kind of conceptual which are hard to remember and
difficult to understand for students. Though the students are full of enthusiasm, seeing
the hard-professional courses they are scared off. By intervention of H5, the teachers
can add appropriate pictures, music and videos to the complex concepts and tedious
formula. Through this new way, students not only learn with interests but also can do
an anytime and anywhere learning, so that the teachers can get twice the result with half
the effort, greatly improving the learning efficiency. The research group upgraded the
GMDSS PPT courseware into H5 animation and issued in WeChat platform, which is
used by the students got their feedback.

E-LEARNING SIMULATOR SIMULATION TEACHING PLATFORM

Marine engineering simulators as one of the marine simulators which meet the
requirements of the STCW78/95 convention, are devices using computer simulating
equipment of real ships and displays them, it provides marine engineering students with
a more complete real-time operating platform. All the control panel, instrument
appearance, actions, layout and even sound lighting of the simulator are exactly the
same as the real ships, with a strong immersive and realistic sense, and the only
difference is that all the ship status information is the result of using computer
simulation. Students can operate ship power equipment on the simulator platform; they
can carry out the training content repeatedly which is difficult or even not allowed to
casually test in real ships; the trainees can get practical experience during shorter periods
which is only available by accumulating in real ships over a long period; without
damaging a machine, improper manipulation or failure damage can be summarized; the
identification and troubleshooting can be finished which is impossible in the navigation
of a real ship. Therefore, the application of marine engineering simulator can help to
improve the crews’ capability of actual operation and management of ship power plant,
to reduce ship power equipment failure, to reduce the maritime traffic accidents, and to
avoid harm to sea from ships.
Marine engineering simulators are generally composed of simulation teaching training rooms, a coach chamber and a power supply room. Simulation engine room, engine control room and coach room are its main part. It’s hardware and software adopt the combination of system integration technology, the shape of the console is like a real ship, but each automation instrument adopts the computer simulation software. The demonstration classroom and students study room are the important function extension part, which forms a network with the main server, training more than 20 people at a time.

WISDOM CLASSROOM

How to improve the classroom efficiency and change the teacher teaching while the students learning has always been the focus of the college curriculum reform, as a result, the wisdom classroom was born which has changed the traditional classroom teaching mode. The recording information system classroom is based on the Web architecture, applicable to the Internet, local area network, satellite network application, which is a combination of audio/visual courseware, recording, editing, electronic whiteboard, live classroom and courseware on demand, and can also combine with the existing video conference system. Compared to the current broadcasting system of streaming media courseware in China, the system has outstanding technical advantages such as open architecture, customizable, easy to upgrade and simple maintenance, good expansibility and so on, and also application advantages as convenient and simple to use, good editing ability of course update, low cost, etc. which is by far the most competitive courseware recording system. The structure is as follows:

The courseware made and recorded by this recording system not only supports the PowerPoint, Flash animation, HTML file format, but can also get the real-time capture screen of teacher teaching and electronic whiteboard, added with video and audio information forming synchronized multimedia teaching courseware, taking each chapter as the starting point for synchronous broadcasting and edited to be three directories, which avoids the disadvantages of traditional browsing of multimedia courseware played from beginning to end. It greatly saves time, improves the learning efficiency and has simple operation interface and flexible learning means, impressive.

DISCUSSION ON CLASSROOM TEACHING BASED ON INTERNET+

The paper takes marine engineering technology course “Main Propulsion Power Plant” as an example, and carried out Internet+ teaching design for the section of “Ship Fuel System Pipeline Identification”. Relying on the “Main Propulsion Power Plant” network teaching platform, WeChat platform, marine engineering teaching repository, marine engineering simulator, wisdom classroom, etc. of marine engineering department, the teaching process is divided into three phases in strict accordance with the task driven teaching mode: preparation before class, class and after class. The courses are divided into four parts: situation creation, task determination, collaborative learning and effect assessment.

Preparation before class plays a vital role in the whole process of teaching, with a good start, the study will get twice the result with half the effort. The student’s login WeChat platform or teaching platform, choose corresponding teaching modules and
teaching tasks, strengthen totem of knowledge by watching the teaching animation or micro class; Get the task order in advance, understand the difficult study point of this section, complete self-study before class and test the effect of self-study, prepare for the following class teaching.

Before class, the teacher raises questions first, why to carry out ship fuel oil system management and maintenance? By watching the video, the teacher gives a preliminary interpretation: the normal fuel system relates to the normal sailing of ships, marine engineering management personnel must repair and maintain strictly in accordance with the ship maintenance system (PMS), illustrating the necessity and importance of learning this section. Then entering into the learning tasks, first on the course website watching the related micro class video, learning about the relative knowledge of marine fuel line system, and finishing the website learning task. Then by the marine engineering simulator training rooms, students and teachers complete fuel system related knowledge learning by grouping and discussion.

In order to achieve better study effect, the collaborative learning part adopts the combination of virtual and reality means. In the first place, the students finish their learning task in fuel system in the virtual simulation platform, connecting the piping of fuel oil system. If the connection is not correct, the virtual simulation platform will prompt, correct operation leads to the next step, which solves the students’ problems that cannot get timely correcting in the past learning. After times of virtual simulation of operation, the students have mastered the learning points step by step.

To test the effectiveness of the virtual platform, the students come to the training room once again, the teacher explains again and start the real fuel system in training rooms. Before the lecture, students carry out training room safety knowledge learning by WeChat platform or web site first, and then put on training clothing, helmets and work shoes into the training workshop. After entering the practice room, first the teacher explains in detail the order of the fuel system startup and the right steps of switching valves, and then the students perform practical operation. In the student actual operation process, if there is any wrong operation, the teacher timely corrects it, pointing out mistakes, the students themselves through learning website or related information correct the mistakes. Therefore, the purpose of student’s independent study is achieved.

After the practical operation, each team upload their task work orders and the teacher makes the final effect evaluation according to the students’ completing situation of work orders. Because each team is different, the teacher’s emphasis on students’ problems in the process of actual operation and demonstrates the correct operation.

The four stages mentioned above is in accordance with the students’ cognitive regularity, which starts from the actual work environment, and step by step finally achieve the teaching aim.

CONCLUSION

“Internet+ Education” action plan speeds up the whole education and also points out the direction. “Internet+ Education” is a new stage and new opportunity for education informatization, a phase stage which deepens the education service model reform. Marine engineering technology applies “Internet+ Education” model, which can better improve students’ practical ability and cultivate international professionals in compliance with the international requirements.
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