

# Building Practice of Java Web Application Development Course Teaching Team with Shipping Characteristics

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## Abstract

In order to further study and carry out the national vocational education reform plan and explore the establishment of a high-level, structured teaching innovation teacher team, Jiangsu Maritime Institute has established a Java Web application development course teaching team with shipping characteristics. By building a community of shared future with shipping enterprises and establishing a deep cooperation between school and enterprises through a five in one way, a teaching innovation team of Java Web application development course with noble ethics, refined skills, professional and part-time combination, and full of vitality is created. The team carried out project-based teaching reform around the Java Web application development course. It fully highlights the shipping characteristics of talent training and significantly enhance the student awareness of serving the development of the shipping industry.

## Keywords

Java Web application development, Teaching team, Project-based teaching, Three education reforms, School enterprise cooperation.

## 1. Introduction

The National Vocational Education Reform Implementation Plan has proposed that higher vocational institutes should take multiple measures to build a teaching team, and the teaching team should play a leading role in the demonstration of the three education reforms of teachers, teaching materials and teaching methods [1]. The key of the three education reform lies in teachers, and the construction of teacher teams is the key point to promote the three education reform.

The Java Web application development teaching team with shipping characteristics serves the strategic new industrial development plan of Jiangsu Province. The major group layout of the institute is both land and sea, one body and two wings, and the big data technology and application major group is an important wing. The Java Web application development course is the core course of this major group. The team focuses on the construction needs of the important wind, seize the building opportunity of the provincial high-level major group, adhere to the development concept of cross-border integration, and gradually form a distinct shipping characteristic, deep integration of industry and education. The members of the teaching team, who promote each other through competition and teaching. The members understand the whole process of shipping business, know the whole process of Java Web application development, and can use mainstream technology to solve smart shipping problems.

## 2. Construction idea of Java Web application development course

In order to reflect the shipping characteristics and implement the task of establishing morality and cultivating talent, the software technology major has selected project-based teaching cases that integrate value guidance with industry characteristics. The project-based teaching takes the Yangtze River Trunk Ship Water Pollution Supervision and Service Information System (Water Pollution System for short) as the carrier, and applies the technology applied in the project to the curriculum system of the entire software technology major, cloud computing technology, big data technology and other majors through technology decomposition and technology iteration. Java Web is a technology stack that uses Java technology to solve related web Internet fields [3-4]. It is the basis for enterprises to develop Web applications. Students need to master the knowledge of JSP, Servlet and MVC patterns. Focusing on knowledge points, the team designed the workbench module of the ship water pollution system shown in Figure 1 as a teaching case, and realized the system functions through the combination of different methods and technical points.

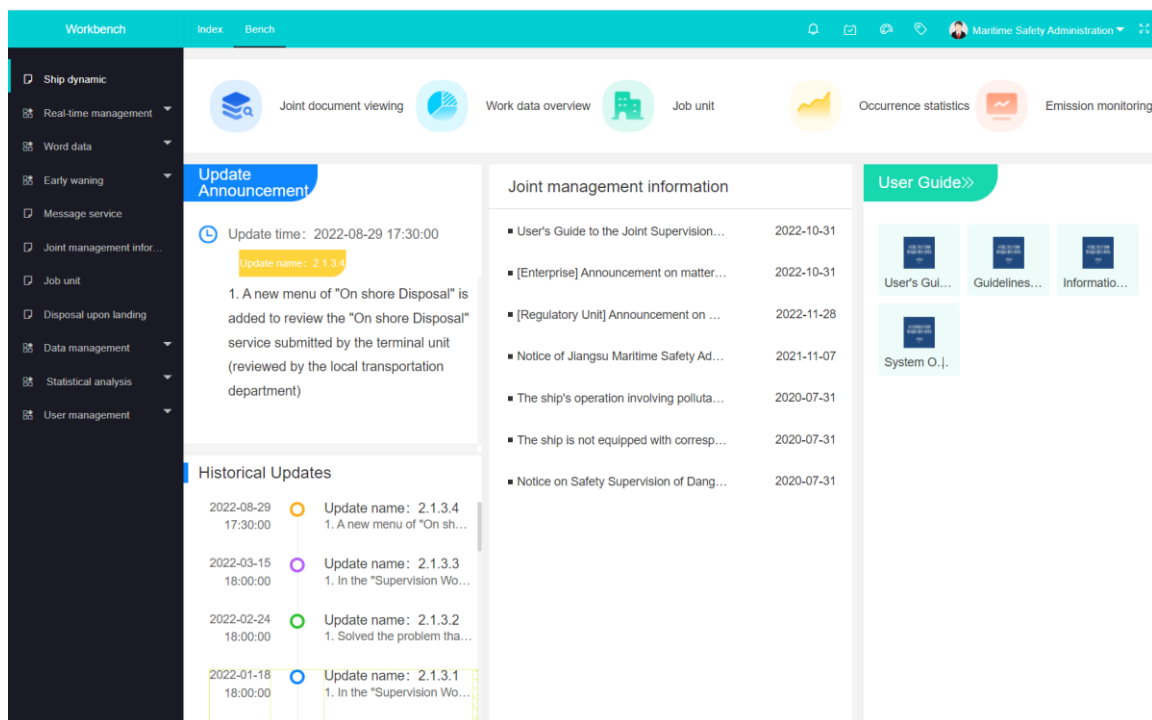


Figure 1: The enterprise workbench

In the project-based teaching of the Java Web application development course, 11 modules of the enterprise workbench are divided into four stages to gradually learn in the form of breakthrough. When students complete tasks, teachers only provide basic knowledge and solutions for project completion. Specific tools, methods and techniques require students to learn independently through online platforms, and teachers play a role in guiding, prompting and answering.

## 3. Team teaching idea and method

### 3.1. Teaching idea

#### 3.1.1. Deep integration of schools and enterprises

For being based on the shipping characteristics of the school, and facing the emerging post group of smart shipping shortage, a five in one professional group project-based teaching

system and practice path with mutual complementarity, symbiosis and common prosperity between schools and enterprises is built. The five in one is the joint construction of curriculum, school and enterprise, the mutual employment of personnel, school and enterprise, the joint construction of platform, standard, school and enterprise, and the joint expansion of business. Through the in-depth cooperation between schools and enterprises, the team comprehensively promoted the reform of project-based talent training mode and realized the transformation from a single training mode to a diversified training mode.

### **3.1.2. Depth connection for post**

In the course building of 17 years, the team has been continuously committed to the improvement of teaching methods and the application research of information technology in the teaching of Java Web application development course, from the separation of teaching from practice, the integration of theory and practice, to the current project-based teaching reform based on OBE concept. For matching the real job demand of the enterprise and design teaching projects with obvious shipping characteristics, the core project runs through the main curriculum. The project is broken down into several sub modules (courses), integrated into a unified technical standard, and teachers work together to implement project-based and modular teaching.

### **3.1.3. Team building by high-level platform**

The team, together with shipping enterprises, built a provincial shipping big data engineering technology center, Nanjing engineering technology center, and a provincial science and technology innovation team. These high-level platforms provide members with learning opportunities and project development platforms to solve the problems of weak practical ability, insufficient project development experience, and difficult integration of science and education. Through the establishment of a school enterprise mixed team, enterprise engineers come to the school to teach, teachers go to shipping enterprises to take temporary posts, and jointly develop projects with enterprise engineers, team members accumulate practical experience, improve practical ability, improve scientific research performance, and promote personal development. The team transforms teachers' scientific research achievements into curriculum content, provides students with the most cutting-edge subject knowledge, and supports high-quality talent cultivation with high-level scientific research.

## **3.2. Teaching method**

### **3.2.1. Hybrid teaching method based on project driven**

In the course construction of more than ten years, the teaching team has been continuously committed to the improvement of teaching methods and the application research of information technology in the teaching of big data curriculum group in higher vocational education, from the separation of teaching from practice, the integration of theory and practice, to today's hybrid teaching. The hybrid teaching method is to organically combine online and offline teaching, and guide students' learning from shallow to deep-to-deep learning [5]. Java Web application development course is based on the SPOC hybrid learning framework, which is small private online course and is first proposed by Professor Amand of the University of California at Berkeley [6]. According to the work process and tasks of data processing in the information technology industry, skills competition projects are carried out throughout the course to achieve learner centered online and offline integrated learning. The SPOC platform is used to carry out skill contest project driven teaching, promote teachers to more fully control the cognitive characteristics of the curriculum and students, and promote teachers to change from the original lecturing teachers to the teachers who integrate teaching and technology, and from the original lecturer teachers to the leading teachers.

### **3.2.2. Teaching innovation based on big data driven**

The teaching team makes use of education big data innovation and development research to comprehensively promote the development of education towards personalized, scientific and intelligent direction. Based on big data technology, the teaching team leads students to develop job analysis and recommendation methods, acquire the skills required for the job in real time through the system, scientifically and reasonably adjust the talent training program, and timely update the teaching content, so that talent training can meet the rapid development of information technology. Based on big data technology, the teaching team builds student behavior analysis and mining methods, analyzes students' learning and consumption behavior. It provides a basis for objective and comprehensive evaluation of students, and improves the quality of school education and teaching.

## **4. Team setting features**

With scientific research as the guide and disciplines as the support, the team building process is accelerated with teaching as the main body. Teachers stick to the three feet platform position, adhere to deepening the cultivation and promotion of socialist core values and build a solid red fortress, and comprehensively promote the construction of education and teaching through improving the innovation mechanism.

### **4.1. Devoted to establishing morality and cultivating talents, and dedicated to tackling key problems and innovation**

The teaching team devotes itself to establishing morality and cultivating talents, adheres to the close combination of teaching, scientific research and technical services. The team takes skill training as the guide, professional teaching as the main body, scientific research and social services as the support, and carries out the Three Comprehensive Education with maritime characteristic culture. The cultivation of craftsmanship spirit runs through the whole process of teaching, and has cultivated a batch of technical talents with team spirit and struggle spirit, innovation consciousness and entrepreneurial ability, which can meet the needs of big data development. The teaching team sticks to tackling key problems and innovation, attaches importance to the cultivation of students' skills, conducts practical teaching and scientific research through two workshops of intelligent shipping application and software development, and has made outstanding achievements in skills competition, innovation and entrepreneurship, incubation of enterprises, scientific research, etc.

### **4.2. Cross border integration and development with industry characteristics**

With the concept of cross-border integration and development, the team has taken the road of dislocation characteristic development to create a team of double responsibility, double post and double salary teachers. The teachers understand the whole process of shipping business, know the whole process of software development, and can use mainstream technology to solve smart shipping problems. The team will design the curriculum of software development + shipping production projects and scientific research projects according to the project-based work tasks, run through the curriculum system of the entire professional group, reconstruct the project-based teaching content, and continue to iteratively develop the teaching content.

### **4.3. Take apprentices to pass on skills and technology inheritance**

The team leads the apprentices to pass on skills, builds a brand of skills competition. The teaching method is improved by skills competitions. The team implements technology inheritance, help and train young and middle-aged technical teachers, and build a team of highly skilled talents. With school enterprise cooperation as the main line, project research as the starting point, workshops as the bridge, technical research is solved.

## 5. Conclusion

The team undertakes the Java Web application development course, serving the national marine power strategy and the needs of Jiangsu Province for smart shipping composite technical talents. The team focuses on the fundamental task of establishing morality and cultivating talents, takes the cultivation of complex technical and skilled talents with shipping characteristics as the support, takes the innovation of school enterprise collaborative education mechanism as the means, and builds a high-quality complex intelligent shipping technical and skilled personnel training system.

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