

Research and Practice on Core Ability Training of Programming Courses to Solve Engineering Problems

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Abstract

The ability of students to solve complex engineering problems is one of the core objectives of software technology training. This paper discusses how to improve the programming ability and engineering practice ability of software technology major students, including the determination of talent training specifications, the implementation of practical teaching content, the reform of teaching methods, the step training of core skills and so on. This will help effectively serve regional industrial economy and realize the organic connection between talent training and industrial demand.

Keywords

Software Technology; Engineering Problem; Ability Training.

1. Introduction

The development of the information industry has enhanced the integration of the Internet and all walks of life. It also makes the software industry internal division of labor structure has undergone a huge change. Taking a typical Internet IT enterprise as an example, the business can be divided into design, development, testing and operation and maintenance according to the workflow. Each link has a corresponding subdivision of posts according to the work process and functions. In the process of talent training, majors should focus on the pillar industries and emerging industries of regional economic development. This determines the talent training specifications, dynamically adjusts the professional course structure, effectively serves regional enterprises to carry out technology research and development and product upgrading, which provides strong support for enhancing students' core competitiveness.

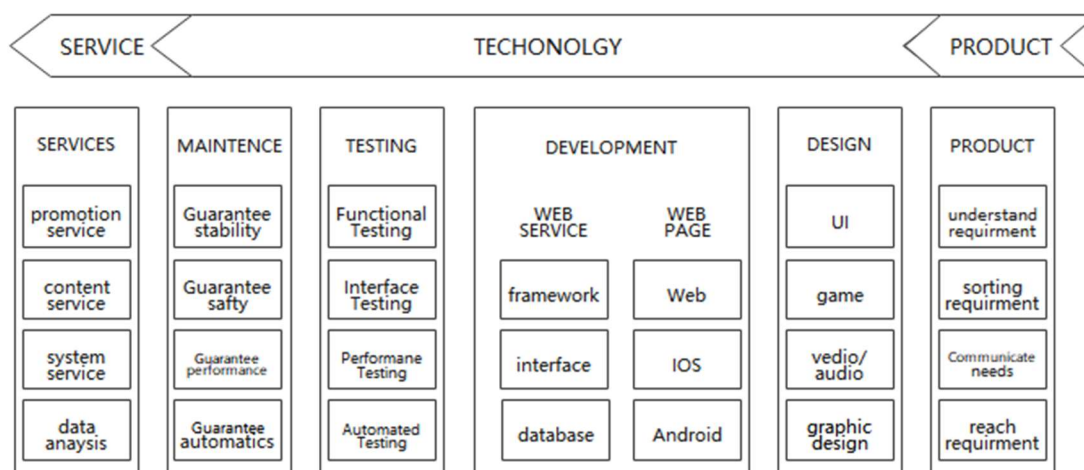


Figure 1. Work flow and corresponding positions of Internet software industry

2. Determination of Personnel Training Specifications

The determination of personnel training specifications is based on the analysis of software industry positions in the regional industry. Then, typical tasks are analyzed to sort out the needs of talent training and clarify the direction of professional training. This major cultivates industry-oriented Positions such as Web application development, mobile application development and front-end development. Through the cultivation of firm ideals and beliefs, scientific and cultural level, good humanistic quality and professional ethics, it helps the talents to have the craftsmanship spirit of excellence, strong employability, and master the professional knowledge and technical skills. By engaging in software development, testing, coding, technical support and other work, it cultivates high-tech and skilled personnel with sustainable development ability. Students need to have the professional core abilities including simple algorithm analysis and design ability, such as HTML, Java, C# programming implementation, and database design, application and management ability, software interface design, Web application development and mobile application development, testing and software project document writing ability, application software products, ability to research and analyze industry technology development. The major helps students preliminarily develop enterprise-level application system, have strong social responsibility and responsibility care, can communicate and integrate, team cooperation ability, certain innovation and entrepreneurship ability, etc. These professional curriculum systems, professional and industry, theory and practice, in-class and extra-curricular education and teaching activities are organized and carried out.

3. Reform of Teaching Practice Content

There is a gap between the knowledge and content of traditional practice and the requirement of actual work. Students' practical ability can not meet the requirements of employers. It cannot reflect the current new generation of information technology, new knowledge; The practice content does not integrate into the quality requirements of talents in new engineering industry. The practice content often only focuses on the training of single professional knowledge and skills and lacks the training of interdisciplinary knowledge and skills. Majors are matched according to industry needs. It reconstructs practice curriculum system systematically according to the cultivation rule of cognition-practice-expertise-creation. According to the idea of "platform + position direction", the platform courses are relatively stable. Through the integration of the common necessary knowledge, skills and qualities, to help students build a holistic understanding of the occupation. Practical teaching content and teaching items come from the actual production of enterprises. It designs and implements the project system of practical teaching in combination with the relevant content of discipline competition and skill competition. Curriculum resources, competitions, courses, certificates, learning, and training are integrated through transforming practical teaching.

4. Carry out the Innovation of Teaching Methods and Means

Carry out the innovation of teaching method and means reform in teaching process. Real-time interaction, SPOC, flipped classroom, mobile learning and other information teaching modes are adopted. Active use of mixed teaching, modular teaching means, flexible and diverse teaching methods. Carry out project-based teaching, scenario simulation, project development, OBE-CDIO, etc. Combined with the post competency model, train the students' practice core ability. Break the traditional closed teaching mode, module curriculum docking professional standards. Training in different vocational directions to help students form the core competence of the post. Adopt the whole process of multi-dimensional progressive practice ability training mode from basic to comprehensive, from comprehensive to expansion, from expansion to innovation. Expand students' learning space. Achieve multi-dimensional breakthrough in space. This enables students to achieve a seamless connection between the learning and actual work atmosphere in the school, and effectively cultivate students' professional quality, practical ability and innovative spirit.

5. Advanced Core Skills Training

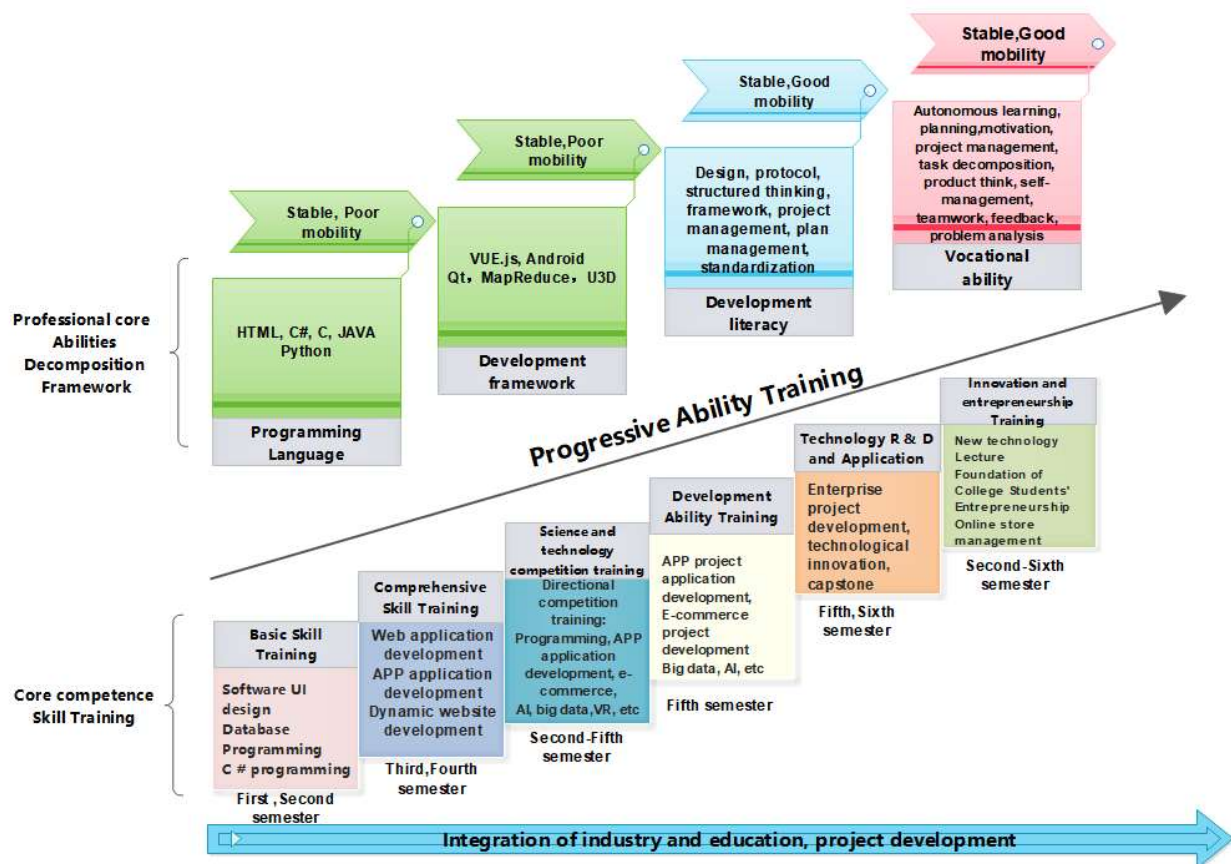


Figure 2. Architecture of competency progressive skill training

According to the diversity of the student group, the difference of the professional basis, the diversity of learning scenes and other actual conditions, the implementation of progressive core skills training, to meet the needs of diversified growth in multiple ways. As a supplement to classroom teaching, the innovation studio, students' innovation project and teachers' studio are built into the expansion base of professional practice education. To carry out extra-curricular teaching activities driven by discipline competitions, skill competitions and student innovation projects, organically combine the development of professional projects, teachers' horizontal projects and teaching and scientific research. "School-enterprise coordination, post coordination, industry-education integration, competition-education integration, project bearing" to cultivate compound application-oriented talents. Build a multi-level cross-interaction practice platform for industry-university-research and innovation and a benign linkage mechanism to solve technical problems together.

6. Conclusion

The cultivation of engineering ability of software technology major students is the core goal of professional education. Focus on the optimization of professional personnel training programs, strengthen the cultivation of core abilities, cultivate students' programming level and practical ability, and gradually cultivate students' ability to solve complex problems. By integrating project development, competition with students' innovation and entrepreneurship and social practice, and comprehensively cultivating students' practical ability, innovation and entrepreneurship quality and social responsibility, the supply side and industrial demand side of talent training can be organically connected.

Acknowledgments

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