

**Practice and exploration of talent training mode of software engineering
specialty based on specialty oriented Teaching**

Jun Nie, Bei Xie, Suping Liu, Fuling Li, Yi Wang

Guangdong University of Science and Technology, Software department, Dongguan City,
Guangdong Province, 523083, China

Abstract: At present, the social demand for computer talents is very large, but the computer talents cultivated by many colleges and universities can not meet the social demand. Software engineering is a branch of computer and an interdisciplinary subject of information industry and engineering technology. The quality of software talents training will be determined by its training mode. Based on software engineering of guangdong institute of science and technology as the research object, to carry out the software engineering applied talents training mode of exploration and practice, from the talent training scheme, curriculum system, practice teaching, teacher team construction, personnel training mode and education fusion are analyzed and expounded, based on the software engineering applied talents training mode of exploration and practice, Hope to further improve the quality of software engineering application-oriented talents training, software engineering professional talent training model for similar colleges and universities have certain reference and reference role.

Keywords: Professional orientation; Software engineering; Talent training model.

1. INTRODUCTION

In February 2017, the Ministry of Education formally proposed the construction of "new engineering", and pointed out that the main contents of the research and practice of "new engineering" are the new concept of engineering education, the new structure of disciplines and specialties, the new mode of talent training, the quality of education and teaching, and the new system of classified development. For ordinary undergraduate colleges, how to accurately grasp the orientation of running a school, find their own teaching objectives and talent training mode is a primary problem. Especially for software engineering major, because it is not only a traditional engineering discipline, but also an engineering discipline to guide the development and maintenance of computer software, there are the following problems in the training of applied talents: First, there is a lack of standards in the construction of major, and the training objectives are too broad. The current training goal of software engineering is not consistent with the social demand for talents, resulting in the disjointed situation between talents and social demand. Second, the engineering practice ability of the division team needs to be further improved. At present, the teaching staff of software engineering major is relatively short of

professional practical knowledge and engineering practical experience. Some teachers enter another school from one gate, and there are few "double-qualified" and "double-capable" teachers. Therefore, the students trained can not really master the actual process of software development. Thirdly, outdated teaching mode is a significant problem in software engineering teaching. The mode of "teacher speaking and student listening" is still a teacher-centered teaching mode, while students as the subject of learning belong to the subordinate status. This teaching mode cannot improve the vitality and quality of teaching. Fourth, teaching methods lack diversity. At present, the teaching method of software engineering major is mainly teaching method and case method. This teaching method lacks necessary communication and discussion between individual students, so students' initiative is weak. Fifth, the teaching content is outdated. Without access to the latest development tools and engineering knowledge, students cannot independently complete software programming and development, and cannot acquire strong practical ability and innovation ability. Sixth, the curriculum is divorced from the needs of the industry. As the school talent training program is usually set and implemented periodically, the technical courses set in the training program lag behind the technical needs of the industry and enterprises, so that students' learning at school is far from the actual needs of enterprises, and they are unable to meet the job requirements of enterprises. Seventh, the practice project is derailed from the enterprise, and the students' team consciousness and communication ability are weak. Student practice lacks real work scenes, student experiments or course designs are mostly based on individual students, the training process lacks team project training and interdisciplinary ability cultivation, and students' communication skills are poor.

In view of these problems, we take software Engineering major of Guangdong University of Science and Technology as the research object, carry out practice and exploration of application-oriented talent training mode of software engineering major, analyze and explain from the aspects of talent training scheme, curriculum system, practical teaching, teacher team construction, talent training mode, integration of industry and education, etc. Hope to improve the quality of software engineering talents training has certain reference significance.

2. THOUGHTS ON THE CONSTRUCTION OF APPLICATION-ORIENTED TALENT TRAINING MODE

The training mode of software engineering specialty in Guangdong University of Science and Technology is characterized by post demand-oriented teaching mode. The so-called professional teaching mode is to divide the major into several teaching directions according to the post requirements of the enterprise, so that students can achieve various skills necessary for a certain post and be competent for a specific field of work after graduation. Every year, we dynamically adjust the talent training program and curriculum system by investigating the needs of local enterprises for talent ability, so as to cultivate application-oriented and compound talents to achieve the goals of knowledge, quality and ability, and serve the various jobs of local enterprises in the direction of C#, Java and PHP. The professional orientation teaching mode fully considers the interests and individual differences of students, and the specific talent training mode is shown in Figure 1.

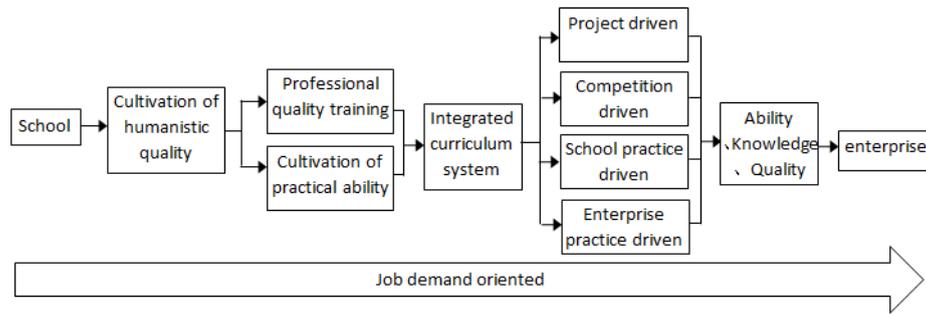


Figure 1. Training mode of software engineering talents

In professional curriculum system research, as shown in figure 2, the current software engineering curriculum system overall structure conform to the requirements of the talent training scheme, have a certain professional characteristics, but there are of course not enough "soft" phenomenon, in curriculum planning, consideration should be given to the software engineering courses on software project management to join the course system, In order to cultivate more favored by the enterprise development and management compound application-oriented talents.

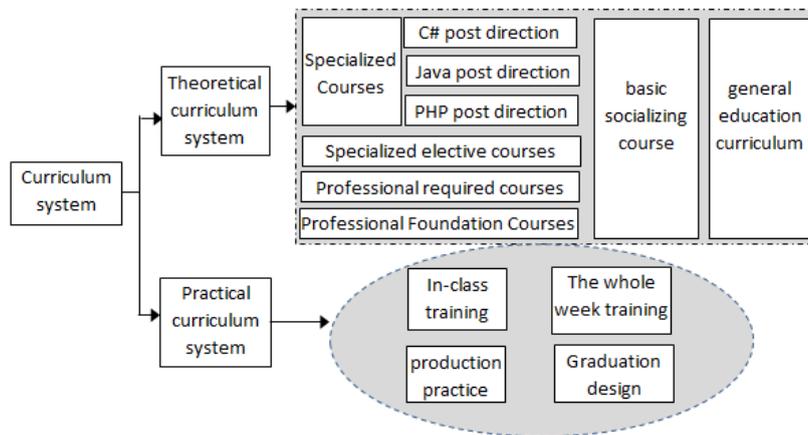


Figure 2 Curriculum system of software Engineering major

3. RESEARCH AND PRACTICE OF APPLICATION-ORIENTED SOFTWARE ENGINEERING SPECIALTY CONSTRUCTION

3.1 Research on curriculum system

Software engineering curriculum system the main can be divided into eight categories, respectively is a public compulsory courses, public elective courses, basic required courses, professional required courses, professional courses, professional courses, specialized practice and other practices, including special practical courses mainly for centralized training in week, a total of 170.0 credits, as shown in figure 3. Structurally, public compulsory courses still account for the highest proportion of credits, up to 30%. Followed by compulsory courses, including basic compulsory courses and professional compulsory courses, accounting for 15% and 10% respectively. Practical courses mainly include special practical courses and other practical courses, accounting for 13% and 12% respectively. Finally, elective courses of professional group and elective courses of professional group account for 7% respectively. Overall, the structure proportion of each module is reasonable and even.

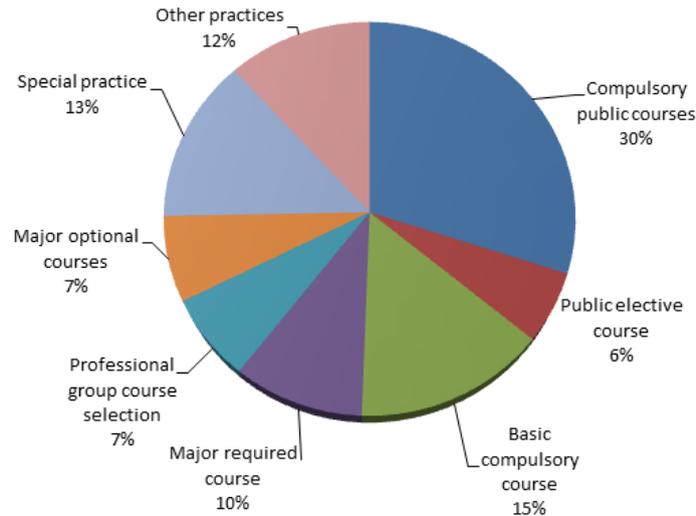


Figure 3 Curriculum architecture of software Engineering major

Internet update iteration speed up, strong self-improvement, TIOBE programming language ranking, is an indicator of the popular trend of programming language, the ranking data is used to examine the programming skills of students and programming teaching is an important indicator of The Times. In the past two years, the Java programming language has maintained the first place, while C# language has gained popularity. In addition, W3Techs is a website dedicated to investigating Web technologies, providing information about the use of various Web technologies. According to data and reports provided by W3Techs, PHP occupies 78.9% of the programming languages used on the server side of Web sites, maintaining the first place. Net in second place and JAVA in third. At the same time, demand for PHP development talent has increased dramatically. Based on the above research results, our school has added three courses related to PHP since 2017.

The course selection system of the professional group is shown in Figure 4. This system effectively highlights the personalized development of students, is conducive to the cultivation of diversified and innovative software application talents, and is also one of the most distinctive characteristics of the connection between the talent training mode of software engineering and job demands. In this way, the employment of students will be broad, improve employment opportunities, enhance the ability of students to adapt to the society.

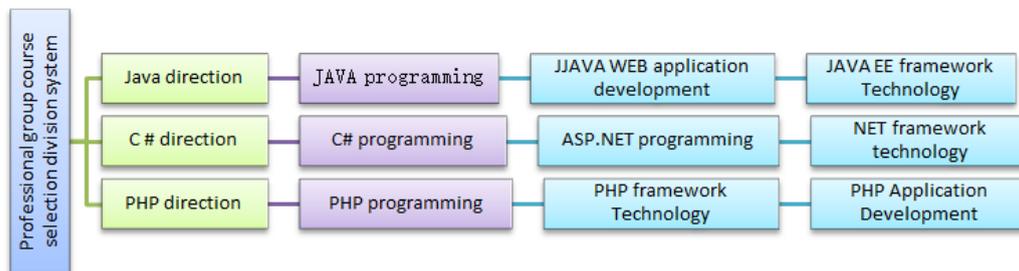


Figure 4 Course selection classification system of professional group

3.2 Construction of teaching staff

The construction of teaching staff is a complex systematic project, and a series of measures should be taken to train a group of "double-qualified and double-capable" teachers for software engineering major. First, based on the school, under the coordination and organization of college leaders, the establishment of the "old with new" system for young teachers, the use of transmission, help, lead, guide and other means to promote teachers' theoretical level and practical ability to be rapidly

improved. Second, according to the specialty and subject characteristics of software engineering, teachers are encouraged to practice in enterprises and public institutions, and use the summer vacation to enter enterprises for practical learning. The third is to create practical conditions to promote the growth of "double teachers and double abilities" teachers. Only through continuous learning and practical operation can the teachers of "double teachers and double abilities" be improved. Therefore, the college not only needs to establish and improve the laboratory, but also needs to rely on the cooperation enterprise to introduce the project to the campus, so that the school teachers and enterprise engineers can connect in the campus, and accumulate practical experience through the actual project of the enterprise.

3.3 Research on practical teaching

Intended to cultivate applied talents, update transformation development software engineering idea, optimize the mode of cultivating talents, build "the unity of" work-integrated learning, raise course system and in stages, multiple link of practice teaching system software, by deepening the reform of classroom teaching based on working process, "project lead, interest, race driver" teaching mode, The balanced development of students' individual ability and teamwork ability can better adapt to the demand for talents in the software industry. Introduce enterprise production practice project, set up specialized class, set up specialized class, set up a series of lectures, set up teacher training and so on. By bringing the real project in production practice into the classroom, students can feel the real project experience and real working environment, and summarize the project experience, which will directly contribute to the employment of students and employment quality, and at the same time, it should have a significant effect on the improvement of the ability to adapt to the job of students.

3.4 Research on the coordinated development of teaching and scientific research

Based on the reality, the software engineering major should coordinate the relationship between scientific research and teaching, carry out the practice and innovation exploration of the organic combination of teaching and scientific research, vigorously carry out applied scientific research, promote the combination of production, learning and research, establish the institutional incentive mechanism of co-existence of teaching and scientific research, so as to achieve a win-win situation between teaching and scientific research. First of all, let teachers establish the concept of lifelong learning, improve their professional ethics and theoretical level, combined with their own actual scientific orientation, actively carry out scientific research in teaching activities. Secondly, the school should establish a set of scientific and effective evaluation mechanism in the process of teaching evaluation, scientific research evaluation, professional title evaluation, etc., to realize the docking and integration of evaluation system. Teaching and scientific research are two important pillars for the development of application-oriented universities. They should develop in a balanced way, promote each other and improve together.

3.5 Research on the integration of industry and education

Enterprises are an important driving force and implementation subject of industry-education integration school-enterprise cooperation. One of the functions of colleges and universities is to serve the local economy actively, and to serve the regional economy well, enterprises need to guide. Only by affirming the important role of enterprises in the cultivation of vocational core competence can

the five requirements of the integration of industry and education be truly realized, namely, the connection between professional setting and industrial demand, the connection between curriculum content and vocational standards, the connection between teaching process and production process, the connection between graduation certificate and vocational qualification certificate, and the connection between vocational education and lifelong learning. The curriculum system is optimized and integrated through the integration of industry and education, school-enterprise cooperation and the participation of experts from industry and enterprises in teaching activities, so that the curriculum content and professional standards, teaching process and production process are connected more closely.

4. CONCLUSION

In this paper, based on software engineering applied talents training mode of exploration and practice, from the curriculum system, practice teaching, teacher team construction, personnel training mode and education fusion are analyzed and expounded, hope have a certain reference function to the same college, to further improve the quality of software engineering applied talents training play a role.

REFERENCES

- [1] SHAO Xue-hang.(2018).Exploration and practice of software engineering talents cultivation mode based on the change from private universities to applied type universities[J]. Heilongjiang Science, 9(04),40-41.
- [2] Ruan Mengli.(2019).Research on the New Model of Soft Engineering under the Background of New Engineering[J]. China Modern Educational Equipment, 648(22): 107-110.
- [3] ZHANG Jin LIU Hong.(2020)Practice and Thinking on Talent Development Mode of Software Engineering[J]. 19(01),11-14.
- [4]GONG S Y,LI D,YIN N,et al.(2016)International collaborative programs in Software Colleges of China[J].(8):51-54.
- [5]ZHANG Jin LIU Hong.(2020)Practice and Thinking on Talent Development Mode of Software Engineering[J]. Software Guide , 19(01),11-14.
- [6]YUAN Song MEI Yun-hong.(,2019)Exploration on the Training Mode of Software Engineering Talents under the Background of New Engineering[J]. Modern Compute,(28),64-67.