

Thoughts on the Construction of Software Engineering Majors in Provincial Universities

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I. INTRODUCTION

The software engineering major is oriented to the social demand of national software industry development, based on the electronic information industry [1], which is one of the emerging professions related to the "four strong" industries in Shandong Province, especially in Zibo City, and oriented to the innovative development demand of national new-generation information technology and application fields, especially transportation and logistics, social service management, intelligent agriculture and other industries, to cultivate With a strong theoretical foundation, solid professional knowledge and application ability in the discipline of software engineering, they can engage in the design, development, testing and management of key basic software, emerging platform software, industry application software, as well as big data, cloud computing and other emerging information technology-related work, and the overall development of moral, intellectual, physical and aesthetic engineering talents.

The software engineering program of the Shandong University of Technology originated from the computer application program established in 1986, which is the earliest information technology program established in Shandong Province, and began to enroll undergraduate students in software engineering (school-enterprise cooperation) in 2011, which is the first batch of "school-enterprise cooperation 3+1 training mode reform pilot program" in Shandong Province [2]. In 2012, it was awarded the master's degree in software engineering, and in 2013, it was approved as the project construction major of Shandong Province's famous school with special characteristics for cultivating applied talents, and in 2019, it was approved as the master's degree in electronic information, and in 2020, it was approved as the construction point of Shandong Province's first-class major.

II. PROFESSIONAL FEATURES

After more than ten years of unremitting construction and development, Shandong University of Technology has formed the following advantageous features in software engineering:

A. Perfect integration of industry and education, school-enterprise collaborative education mechanism

Cooperate with domestic and foreign well-known IT enterprises to run schools, and establish cooperation with local high-tech enterprises in Zibo to cultivate talents. It has formed

a comprehensive integration of talent training supply and industry demand structural elements.

B. All-round practical ability enhancement training system

Based on the professional basic practice teaching platform, school-enterprise practice teaching platform, innovation laboratory, research mentor, and other comprehensive practice ability cultivation system, highlighting the strengthening of practice ability enhancement.

C. Multi-dimensional education model of theory, practice, research, and innovation: theoretical teaching

100% coverage of information construction. Received several provincial and municipal research and educational reform projects, involved in intelligent transportation, chemical industry, medical and health care, electric power, intelligent agriculture, and other multi-industry fields.

III. PROFESSIONAL DEVELOPMENT IDEAS

As a first-class undergraduate major construction point in Shandong Province, the software engineering major of Shandong University of Technology will be based on Zibo's "four strong" industrial development needs, focusing on intelligent manufacturing, medical recreation, intelligent agriculture, and other special industries to develop big data, cloud computing, industry software development, and other personnel training, mainly including:

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- Relying on the "Golden Policy 37" of Zibo City [3] and the priority development strategy of talents of Shandong University of Science and Technology, optimize the structure of professional teachers and build a team of excellent software engineering teachers.
- Take the initiative to dovetail with the demand for high-quality software talents in Zibo's traditional advantageous industries, optimize the talent training system, and achieve a balanced and positive interaction between talent training and social demand structure.
- Raise resources for professional construction through multiple channels of "government, school, industry, and enterprise", and increase the construction of teaching infrastructure for software engineering.
- Build a first-class platform for training new-generation information technology software talents, and carry out in-depth cooperation with the information technology industry, enterprises, local governments, scientific research institutes,

and high-level institutions at home and abroad to realize the integration of various teaching resources.

- Through the internal construction of software engineering majors, we produce first-class results in faculty, high-quality teaching resources, and technological innovation.
- Relying on the school-enterprise collaborative education platform, we will build a special advantageous software engineering major that is compatible with the economic development of Zibo City and has influence and competitiveness in the country.

IV. PROFESSIONAL CONSTRUCTION CONTENT

Based on the needs of economic and social development in Zibo City, the software engineering program of the Shandong University of Technology focuses on the electronic information industry and the major project of the conversion of new energy in Shandong Province, facing the new generation of information technology fields such as big data and cloud computing, actively connecting with the demand for high-end information technology talents in the development of "four strong industries" in Zibo City, combining the advantages of our university and the characteristics of talent training, insisting on moral education and implementing the "new model" of composite and application-oriented talent training focusing on the multidisciplinary intersection. and talent training characteristics, adhere to the moral education, the implementation of the focus on the multidisciplinary intersection of composite, application-oriented talent training "new model", to build distinctive industry characteristics, domestic influence, and competitiveness of the software engineering profession.

A. Cultivate high-quality professionals

Proactive adaptation to the demand for talents in economic and social development and the optimization and upgrading of the structure of the electronic information industry of Zibo City. Cultivate students who can meet the development of socialist modernization and software engineering technology, with comprehensive development of morality, intellect, physique, and aesthetics, rich in conscience and social responsibility, with the foundation of mathematics and natural science knowledge, mastering the basic theory, basic skills and basic methods related to software engineering, big data, and cloud computing, with the ability to use professional knowledge to analyze and solve complex engineering problems, and able to engage in the design, development, testing, and management of basic software, emerging platform software, industry application software, etc. in the field of big data and cloud computing. They are capable of designing, developing, testing, and managing basic software, emerging platform software, and industrial application software in the field of big data and cloud computing, and are also capable of considering legal, environmental, and sustainable development factors, as well as possessing the sense of engineering innovation, entrepreneurship, team spirit, communication, and expression ability and lifelong learning ability.

B. Building a team of excellent teachers

We implement the "Golden Policy 37" of Zibo City, establish a faculty with an optimized structure, and promote the sustainable development of the profession. Through the introduction, training, and outsourcing, we will establish a team of "double-teacher" teachers and teaching backbone with the new educational concept, high moral character, high teaching level, strong industrial ability, pioneering and innovative spirit, reasonable titles, education, academic edge and age structure, and a combination of full-time and part-time positions with professional knowledge and rich practical working ability in software engineering, big data and cloud computing.

C. Create brand professional characteristics

Focusing closely on the demand of electronic information industry in Zibo City and the new old energy conversion project in Shandong Province, adhering to the engineering education concept of "student-centered, output-oriented and continuous improvement", taking talent cultivation as the focus of professional construction, combining software engineering with big data and cloud computing to build a distinctive and advantageous major, putting the ideological and political education Through the whole process of talent cultivation, establish and improve the evaluation and guarantee mechanism of talent cultivation quality and course quality, and build the software engineering major into a national competitive specialty based on the first-class specialty construction point in Shandong Province.

V. CONCLUSION

Based on the needs of economic and social development in Shandong Province and Zibo City, the construction of software engineering in the Shandong University of Technology is closely focused on the electronic information industry and the major project of Shandong Province's new old dynamic energy conversion comprehensively sorted out the development of professional construction ideas, refined the construction content of training high-quality professionals, building an excellent team of teachers, strengthening the construction of teaching infrastructure and creating brand professional characteristics, etc., to improve the software engineering The overall quality of the profession.

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