

Reform of training mode for applied talents in microelectronics specialty

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Abstract: With the rapid development of society and the continuous transformation and upgrading of economy, the training mode of applied talents in universities is in urgent need of reform. This paper discusses the importance and role of base co-construction, talent co-education and achievement sharing in the reform of applied talents training mode in colleges and universities. By establishing off-campus practice education base, strengthening practice teaching and promoting cooperation between industry, university and research, the innovation and development of applied talents training mode in colleges and universities can be promoted, and more excellent applied talents can be provided for social and economic development.

Key words: Application-oriented talents; Training mode; Base co-construction; Talent co-education; Fruits sharing

Introduction

The training of applied talents in colleges and universities is an important task to adapt to social needs and promote economic development. However, the traditional training mode only focuses on the imparting of theoretical knowledge, but neglects the cultivation of practical ability and innovative spirit. As a result, many graduates have mastered the basic theoretical knowledge, but they cannot flexibly apply it to practical work. This training mode has been unable to meet the needs of the society for applied talents. Therefore, we need to reform the training mode of applied talents in colleges and universities to adapt to the development of The Times and the needs of society.

The integrated circuit industry is a technology-intensive industry, new technologies and new processes continue to emerge, and experimental equipment is updated quickly. If the training mode and practical resources of the practice base can not be updated and upgraded in time, then the trained talents will not be able to meet the needs of the development of the industry, and there is a big disconnect. In addition, the traditional practice base personnel training mode often only focuses on the training of certain professional skills, and the training of other qualities is not enough. In recent years, the rapid development of the integrated circuit industry has put forward higher requirements for talents. In order to train application-oriented talents to adapt to the development of the industry, it is necessary to reform the talent training mode, rely on off-campus practice bases, jointly build and share the latest equipment and resources of the industry, and promote the reform of the talent training mode.

I. Personnel training model reform measures

1. Base construction and cooperation platform

Base co-construction is an important link in the reform of applied talents training mode in universities. By establishing cooperative relations with enterprises, governments and social organizations and jointly building cooperation platforms, more practical opportunities and practical environments can be provided for students. Colleges and universities can cooperate with enterprises to build off-campus practical training bases to provide students with a real working environment and project practice opportunities. At the same time, the government and social organizations can also provide resource support and policy guarantee to jointly promote the reform and development of application-oriented personnel training mode in colleges and universities.

Focusing on the strategic needs of the country in the IC industry and the demand for highly skilled talents for the innovation-driven development of the strategic emerging industry of IC in Sichuan Province, relying on the “co-construction of the Department and committee”, the information, technology and talents of the government, industry and university support each other and cross-integrate, forming a “three-helix” structure. In this structure, enterprises, universities and the government jointly participate in the construction of practice bases to promote the spiral rise and vigorous development of the integration of industry and education, so as to promote the development of IC industry and the training of highly skilled talents.

After years of construction, the teaching facilities of the microelectronics practice base have been continuously improved, especially after the cooperation of the university and enterprise to build the practice teaching platform, the experimental and practical training conditions of the microelectronics major have been greatly improved, and the semiconductor process laboratory, virtual-real manufacturing laboratory, failure analysis laboratory and so on have been built. In 2022, Sichuan Semiconductor Power Module Packaging Engineering Technology Research Center will be established as a co-construction unit with Chengdu Jijia Technology, a subsidiary company of Shilan. The base is in a leading position in the construction of professional laboratories in similar universities in the province.

2. Co-education of talents and strengthening practical teaching

Talent co-education is the core content of the reform of applied talent training mode in colleges and universities. For the whole process chain and key positions of the integrated circuit closed test industry, the university and enterprise have jointly formulated detailed plans and contents in the aspects of talent training programs, curriculum Settings, teaching methods and student management, established a hierarchical teaching system with practical ability training as the core, and formed a school-enterprise co-construction, co-management, co-

evaluation and sharing practical teaching mode inside and outside the school.

First of all, in terms of talent training programs, both schools and enterprises fully consider the needs of the IC closed test industry, and determine the training objectives and core competence requirements. Through in-depth cooperation with enterprises, the university can understand the latest development trends and technical requirements of the industry, and incorporate these information into the talent training program to ensure that students have skills and knowledge that match the needs of enterprises after graduation.

(2) Secondly, in terms of curriculum setting, the university and the enterprise have jointly developed a series of courses related to the integrated circuit closed test industry. These courses not only include the teaching of theoretical knowledge, but also pay attention to the cultivation of practical ability. Through laboratory classes, internships and project practice, students are able to learn and apply what they have learned in a real working environment to improve their practical skills and problem-solving skills.

(3) Third, in terms of teaching methods, both schools and enterprises have adopted a variety of flexible teaching methods, such as case teaching, teamwork, practice-oriented, etc. Through these methods, students can take the initiative to participate in learning and cultivate innovative thinking and teamwork ability. Keep abreast of the company's latest technological developments in teaching content. Through the transformation of typical technology into teaching cases, scientific research results into course content, real projects into graduation design topics, production environment into education scenes, with real application content to achieve the same frequency resonance of teaching content and technology development. At the same time, students are allowed to rely on real projects in real factories, guided by real technicians, and complete real products in the real work process. In addition, the school also cooperates with enterprises to carry out a tutor system to provide students with personalized guidance and support to help them better adapt to the work requirements of the integrated circuit closed test industry.

(4) Fourth, strengthen the construction of practical teaching teachers and strengthen the communication and learning between the school and the enterprise. On the one hand, arrange teachers to go out to enterprises to carry out substantive engineering practice, understand the production process and testing standards of power module packaging, accumulate practical experience and improve practical technical guidance ability, and become real "double teacher" teachers. On the other hand, let the practice base of senior managers and experienced technical engineers to the school to teachers, students to open special lectures, introduce the real time dynamics of the industry and the latest technology, and make the school and enterprise mutual exchange learning and training routine, both sides grow together, and build the teacher team together.

(5) Finally, in the aspect of student management, the university and enterprise have established a close contact and communication mechanism. The school and the enterprise are jointly responsible for the management and evaluation of students, and timely understand the learning situation and practical performance of students. At the same time, the school shares resources with enterprises to provide students with internships and employment opportunities to help them transition smoothly into their careers.

Therefore, for the whole process chain and key positions in the integrated circuit closed test industry, the university and the enterprise jointly formulated detailed plans and contents in personnel training programs, curriculum Settings, teaching methods, student management and other aspects, established a hierarchical teaching system with practical ability training as the core, and formed a school-enterprise co-construction, co-management, co-evaluation and sharing practical teaching mode inside and outside the school. This mode can effectively improve students' practical ability and employment competitiveness, and meet the demand for high-quality talents in the IC closed test industry.

3. Share results and promote industry-university-research cooperation

Sharing results is an important goal of the reform of applied talent training mode in universities. Colleges and universities should actively promote industry-university-research cooperation and combine scientific research achievements with practical teaching. The sharing and transformation of scientific and technological achievements should be realized through the protection of intellectual property rights and the improvement of the mechanism for the transformation of achievements. To be specific, it can be achieved by means of technology transfer, technology investment, and industry-university-research cooperation. The exchanges and cooperation between schools and enterprises in the practice base should be strengthened by regularly organizing seminars and symposiums. These measures will help promote the transformation and application of scientific and technological achievements, promote the deep integration of practice bases and industries, and make positive contributions to social and economic development.

In terms of intellectual property protection, both schools and enterprises can establish a sound intellectual property management mechanism to ensure the legitimacy and independence of scientific and technological achievements. By applying for patent, trademark and other intellectual property protection measures, the uniqueness and commercial value of innovative achievements can be guaranteed. At the same time, it is also possible to establish a mechanism for transforming scientific and technological achievements into actual products and services by means of technology transfer and technology investment, so as to achieve a win-win situation of economic benefits and social value.

In terms of industry-university-research cooperation, the practice base can establish long-term cooperative relations with related enterprises to jointly carry out scientific research projects and technology development. By sharing resources and complementing each other's advantages, the base can realize the organic integration of industry, university and research, and promote the transformation and application of scientific and technological achievements. At the same time, the demand of enterprises and the research strength of practice bases can be effectively combined by means of technology investment, etc., to promote the industrialization and commercialization of scientific and technological achievements.

In 2019, the College led the establishment of Sichuan Electronic Information Production and Education Alliance, strengthened the main role of enterprises, promoted the structural reform of the supply side of human resources, and innovated the operating mechanism and personnel training model of the base. Through this platform, the alliance facilitates information sharing between schools and enterprises, including practice base construction, technology research and development, activity arrangement, resource sharing, experience exchange, etc.

II. Reform results

The reform of application-oriented personnel training mode for microelectronics specialty has achieved certain results through the joint construction and operation of practice bases.

1. First of all, relying on the practice base, the professional construction is promoted. The two sides of the university and enterprise have held many discussions on the professional positioning, curriculum system and training program revision. In 2021, the major of Microelectronics Science and Engineering will be approved as a state-level first-class undergraduate major construction point of the national "Double Million Plan". In 2023, the discipline of electronic science and technology will be selected into a new round of "Double first-class" construction of Gongga plan to cultivate disciplines. Our school was ranked first in the 2023 Chinese University Ranking of Microelectronics Science and Engineering (Applied) by the Alumni Association.

2. Secondly, with the help of the practice base, we have built a high-level "double-qualified" teacher innovation team. During the co-construction period, the school arranged a number of teachers to Chengdu Shilan Company for practical training and temporary training, improve the practical experience and practical guidance ability of teachers, and effectively improve the proportion and quality of "double teacher" teachers.

3. Third, relying on the practice base, the school has carried out in-depth cooperation with enterprises. In terms of teaching, the practice base undertook 8 experimental teaching reform research projects, and won one first prize of Sichuan Province Teaching Achievement Award. In terms of scientific research, aiming at some problems encountered in power module packaging technology and application practice, the university and enterprise jointly formed a scientific research team. On this basis, the joint application and approval of Sichuan semiconductor power module packaging engineering technology Research center.

4. Fourth, improve the students' practical ability and comprehensive quality. The employment rate of graduates shows that the average employment rate of students majoring in electronic information in the past three years is more than 95%, of which more than 85% of graduates are employed in professional-related industries. Based on the practice base, students participating in discipline competitions and practical projects account for more than 90 percent of the total number of students. Through the training of the practice base, graduates' practical skills, problem-solving ability and innovative consciousness as well as teamwork ability have been greatly improved, and have been highly praised by society and enterprises.

III. Conclusion

The reform of application-oriented personnel training mode in colleges and universities is an inevitable choice to meet social needs and promote economic development. Through base construction, talent co-education and achievement sharing, the establishment of off-campus practice education bases, strengthening practice teaching and promoting industry-university-research cooperation, promote the innovation and development of applied talent training mode in colleges and universities. Through the training of the practice base, the practical skills, problem solving ability, innovation consciousness and teamwork ability of the graduates have been greatly improved. They are considered to have excellent practical ability and comprehensive quality, adapt to various working environments, quickly integrate into the enterprise team, and make positive contributions to the development and innovation of the enterprise.

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