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Research on Talent Cultivation in the School of Optical Network Industry

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Abstract

With the development of optical network technology, its requirements for talent cultivation are increasingly increasing. At present, the cultivation of optical network talents still faces problems such as mismatched demands, mismatched courses, and difficult to meet practical training conditions. The Optical Network Industry College of Wenzhou Polytechnic has formed a new model of talent cul-tivation through on-the-job course competitions, a development mode that em-phasizes both industrial technology services and talent cultivation, and an inte-grated education path of "teaching follows enterprises and vocational educa-tion goes abroad". The school and enterprise jointly establish a "1+1+N" frame-work for the construction of the Optical Network Industry College, which aims to cul-tivate and transport a large number of application-oriented, composite, and in-novative optical network technology skilled talents for Huawei Technologies Co., Ltd.'s optical network business and the stable supply chain of small and me-dium-sized enterprises in the industry.

Keywords

Optical Network; Talent Training; Aco Construction Between Schools And En-ter-Prises

1. Introduction

With the construction of a new generation of high-speed, mobile, and secure information infrastructure, a network space of interconnected everything, human-computer interaction, and the integration of heaven and earth is taking shape. As of July 2022, the total scale of data center racks in China exceeds 5.9 million standard racks, and the gigabit optical network has the ability to cover over 400 million households, achieving "5G connectivity in every county and broadband connectivity in every village"[1]. The three basic tele-communications companies have 697 million active IPv6 users and 1.032 billion internet users[2]. The continuous iteration and upgrading of optical networks have led to a mis-match between the supply of human resources in the optical network industry and the job demands of enterprises. The lack of close cooperation between schools and enterprises in

the direction of optical networks has become increasingly prominent. The shortage of high-quality technical and skilled talents who can engage in the construction and maintenance of optical network equipment continues to widen, becoming a bottleneck for many ICT manufacturers such as Huawei to achieve the sinking of optical network business.

The optical network industry has long failed to carry out effective and large-scale school enterprise cooperation, resulting in a disconnect between industry demand and talent cultivation in schools. As a new organizational form of joint construction, management, and sharing among multiple entities such as universities, governments, and industry enterprises, industrial colleges are of great significance in cultivating technical and skilled talents in vocational colleges, and are also an important carrier for solving the development of the optical network industry.

Industrial college is a new form of college that aims to achieve an organic combination of talent cultivation and industrial development by combining academic research, technological innovation, and industrial application[3-13]. Cheng Baozhi believes that local undergraduate colleges should deepen the integration of industry and education, accelerate transformation and development, promote the organic connection between the education chain, talent chain, industry chain, and innovation chain, and promote the reform and innovation of talent training mechanisms[14]. Gu Yongdong and others proposed that under the industrial college model, China should carry out integrated training of engineering professional degree research, production, and education, and should start from several aspects such as jointly building curriculum systems, interdisciplinary fields, mentor teams, and industry university research collaboration platforms[15].

However, at present, the theoretical research of industrial colleges mainly emphasizes their universality, while the construction of optical network industry colleges has its own characteristics and practicality in the communication industry. Currently, there is a lack of talent cultivation theory for optical network industry colleges. In addition, at this stage, there is a shortage of theoretical samples for industrial colleges, and most industrial colleges are still in the early stages of construction, so it is necessary to increase the sample size for research in industrial colleges. Based on this situation, this article explores the theory of F5G new generation information technology talent cultivation through the construction of the "Wen Zhi Huawei" Optical Network Industry College, and creates a new ecology of F5G talent cultivation through the three-axis linkage of "enterprise school enterprise", providing theoretical support for talent cultivation in vocational colleges.

2. The problems faced by talent cultivation

The skill level of talents cultivated by schools cannot match the needs of industrial companies. The practical cases of insufficient cooperation between schools and enterprises have not been transformed into practical training tasks; The course does not align with the core competencies of the position and cannot meet the actual needs of the enterprise; Not integrating enterprise professional certification, core competition cases organized by enterprises, and practical training tasks into the

curriculum. Therefore, taking the Optical Network College as a carrier, in response to the talent cultivation mode of "dual education, post certification, course training and competition", starting from several school enterprise cooperation courses, we will reform the courses and pilot them among 2023 and 2024 students to track and investigate the learning effect, explore and improve the feasibility of the talent cultivation mode and the problems encountered in the implementation process.

The content of the school's professional curriculum system is not suitable for the requirements of building a new knowledge system for optical networks. The current talent training program for computer networking majors is somewhat mismatched with the industry's development trends; The course needs to be adjusted according to the actual situation; There are many versions of optical network textbooks on the market, diverse and varied, all of which have certain problems. For example, some textbooks have unreasonable chapter arrangements and inflexible forms, while others emphasize theory over practice, knowledge over quality cultivation, and are not suitable for vocational college students. Therefore, taking the Optical Network College as a carrier, we will cooperate with leading enterprises to position our professional talent training program in the direction of IP+optical, reconstruct the curriculum system, implement new courses, and write new technology textbooks.

The professional training conditions of the school cannot support the implementation of optical network training tasks.Schools lack real optical network equipment, and students have limited opportunities to practice; There is a certain deviation between teachers and the real project knowledge, abilities, and experience required by the industry. Therefore, taking the Optical Network College as a carrier, we will build an optical network training base, create a curriculum teaching team that keeps up with the pace of the times, and jointly explore F5G teaching and teaching reform, including training equipment operation, training task setting, training teaching standards, etc.

3. Integrated Education Path of Industrial College

3.1. The three-axis linkage of "enterprise school enterprise" serves the regional economy and establishes a new model of talent cultivation through “job-course-certificate-competitions”

Flexibly set professional directions based on regional industrial development needs, keep up with industry trends, accurately adjust professional positioning, network job skill requirements, and talent training plans. Closely focusing on the network core business of leading enterprises in the region, combined with the employment needs of their ecosystem enterprises, we work together with enterprises to create customized talent training programs, focusing on cultivating talents who can adapt to new technology applications, effectively filling the talent gap faced by enterprises in new business expansion. At the same time, actively aligning with the core job requirements, industry benchmark competitions, and authoritative standard certifi-

cates of leading enterprises, organically integrating these key elements into the curriculum system, guiding curriculum design through job demands, improving teaching quality through competitions, and using enterprise certificates to verify curriculum effectiveness, comprehensively enhancing the quality of talent cultivation.

3.2. The three-axis linkage of "enterprise school enterprise" supports industrial development and forms a development mode that emphasizes both industrial technology services and talent cultivation

Focus on industry development trends and accurately extract common issues in the process of talent cultivation. Through deep cooperation between schools and enterprises, we jointly discuss talent cultivation plans, build practical training environments, jointly discuss curriculum systems, jointly build and share teaching resources, jointly form a dual teacher team, jointly guide students' graduation design practice, and jointly evaluate students' abilities, ensuring that talent cultivation can seamlessly connect with leading enterprises, small and medium-sized enterprises within their ecosystems, and entrepreneurial enterprises in all aspects and processes, providing strong support for the healthy development of the industry. Adhere to student-centered approach and actively promote enterprises, engineers, and projects to enter the campus. Adopting various project delivery models such as "engineer teacher student", "teacher student", and "engineer student", organizing teachers and students to jointly study the practical difficulties faced by enterprises, realizing the feedback of technical skills services, and assisting the growth of teachers and students. Strictly implement the enterprise system for teachers during summer vacation, actively participate in professional technical skills training activities, and promote the construction and development of the "technician teacher trainer" three teacher team.

3.3. The three-axis linkage of "enterprise school enterprise" promotes international cooperation and achieves the new goals of education output, education output with enterprises, and vocational education going global

Build a series of high-quality professional standards, curriculum standards, and high-quality teaching resources, export them to foreign countries, cultivate more vocational education brands with international influence, and explore innovative international exchange and cooperation models for vocational education. Through the coordinated development of education and industry, we aim to assist vocational colleges in following the pace of enterprises and entering the international market. We actively promote cooperative education projects between schools and local overseas enterprises and universities, and achieve the internationalization of vocational education.

4. Exploration and Practice-Taking Wenzhou Polytechnic Huawei Optical Network Industry College as an Example

Relying on Wenzhou Polytechnic, closely connecting with local governments, telecommunications operators, digital industry enterprises such as Huawei, etc., the first "Wenzhou Huawei" Optical Network Industry College in China has been established. The school and enterprise jointly establish a "1+1+N" framework for the construction of the Optical Network Industry College. The first "1" refers to Wenzhou Polytechnic, the second "1" refers to Huawei Technologies Co., Ltd., and the third "N" refers to enterprises in the Huawei ecosystem. On the basis of the existing Huawei ICT Industry College (Digital Communication Direction), we will construct an "IP+Optical" curriculum system, jointly build and manage a shared optical network industry education integration base, create a demonstrative talent training entity that integrates talent cultivation, technological skills innovation, enterprise services, student employment and other functions, and lead the demonstrative development of the new generation of information and communication technology majors in China.

4.1. Connect with local industrial development needs and jointly build ICT related majors between schools and enterprises

Guided by the actual needs of the development of the optical communication industry, closely aligned with emerging formats, new positions, and new technological changes, we will conduct detailed research activities in the industrial ecosystem of enterprises, and regularly promote the annual "professional demonstration" work of the computer network technology major. Based on Huawei's suggestions and the construction plan of Wenzhou Polytechnic, a complete education chain from "industry industry enterprise profession profession curriculum employment" has been established, committed to cultivating high-quality, application-oriented, and innovative optical network technology talents suitable for the major project of "One Port and Five Grains" in Wenzhou area.

4.2. Integrate the entire process of talent cultivation and collaborate with schools and enterprises to establish professional standards based on the core competency requirements of job groups

Based on the current situation and existing problems of professional construction, taking the required abilities of the optical network job group as the starting point, the concept of professional group construction based on the optical network industry chain is proposed. On the basis of professional construction practice, we will conduct in-depth research on the innovation of the talent training mode for on-the-job course competitions, the construction of the "IP+Optical" curriculum system, the establishment of the optical network industry education integration training base, the development of teaching resources in the "Optical Network" direction, and the organization of teaching teams. By exploring the establishment and continuous optimization of new professional standards, we aim to effectively improve the quality of talent cultivation in ICT fields such as optical networks, and en-

hance the capabilities of the professional service industry.

4.3. Update optical network equipment and jointly build an "Optical Network Industry Education Integration Base"

Building an optical network industry education integration base on campus, based on the entire ICT industry chain, undertaking tasks such as student training, teacher training, social training, applied scientific research, and product training and promotion. The base has two major training spaces: one is the all-optical access network training space, equipped with Huawei all-optical network access equipment, supporting relevant course teaching and training, and cultivating students' abilities in all-optical network design, equipment operation and maintenance, and engineering; The second is the training space for all-optical transmission network, equipped with Huawei transmission equipment, to carry out teaching and training on all-optical network transmission technology, etc., to help students master the operation and maintenance skills of transmission equipment.

4.4. Connecting with the practical experience of leading enterprises and integrating teaching resources for school enterprise symbiosis

Jointly building a curriculum system, closely integrating practical job requirements with the latest changes in industrial technology, and working together to create integrated teaching resources. This includes the development of online and offline resources, virtual simulation software, textbook writing, and adaptation of project practice cases. The course content is based on practical job requirements, while keeping up with the development trends of cutting-edge technologies in the industry. Common optical network practice projects are introduced into the course, such as all-optical campus construction, all-optical hospital construction, all-optical hotel, etc., to ensure the practicality and foresight of the teaching content.

4.5. Connect with service resources of ecosystem enterprises, promote technological innovation and social services through joint efforts between schools and enterprises

Relying on the "Optical Network Industry Education Integration Base", we will continue to deepen the integration of industry and education, as well as the integration of science and education. Both sides will cooperate to provide socialized services, including socialized training, horizontal projects, technical support, technology promotion, technical consulting, etc., to serve regional economic and social development and promote industrial transformation and upgrading. Two domestic software classroom projects have been approved, including one in 2023 and one in 2024.

4.6. Docking with enterprise standard certificates, schools and enterprises jointly guide students in practice

Introduce Huawei's international certification system, establish a certification

training and examination center at Wenzhou Polytechnic, cultivate students with industry-leading ICT talent standards, establish targeted learning goals, promote students' technical skills improvement, and provide Huawei related certification and certification services to the society. Approximately 40 students will pass the Huawei ICT certification exam in 2024. Utilize Huawei's advantageous resources and invite Huawei's original factory engineers or engineers from ecosystem companies to give lectures and lead students in practical activities at the school. In November 2024, Ma Honggang, the head of Huawei's Optical Network Product Line Enabling Department, was invited to the school to carry out the "Wen Vocational College Huawei All Optical Network Access Technology Skills Winter Camp" activity.

4.7. To meet the needs of enterprises in the ecosystem, schools and enterprises promote vocational education to go global

Translate professional standards, curriculum standards, course PPTs, and other resources related to optical networks, and export them to enterprises and schools in Malaysia, the United States, and other countries to share the results of school enterprise cooperation; For regions where there is a demand for optical network talents abroad, export graduates to the local area to help enterprises go global; At the same time, invite KKU University in Thailand to inspect the optical network training base and assist enterprises in conducting overseas education.

5. Conclusion

In response to key issues such as mismatched talent cultivation needs, mismatched courses, and difficult to meet practical training conditions in the field of optical networks, Huawei Optical Network Industry College at Wenzhou Polytechnic has taken a series of measures for talent cultivation, mainly including: co building majors, co creating professional standards, co building training bases, symbiotic integrated teaching resources, co promoting technological innovation and social services, co guiding student practice, and promoting vocational education going global. The main educational strategies include: ① "Enterprise School Enterprise" three-axis linkage, serving regional economy, and establishing a new model of talent cultivation through job, course, competition and certification; ② The three-axis linkage of "enterprise school enterprise" supports industrial development and forms a development mode that emphasizes both industrial technology services and talent cultivation; ③ The three-axis linkage of "enterprise school enterprise" promotes international cooperation and achieves the new goals of education output, education output with enterprises, and vocational education going global.

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