

Construction of High-level Local Application-oriented Universities Based on the Development of University Classification: A Case Study in Shanghai

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Abstract—With the popularization of higher education, the development of university classification has been constructed as an almost inevitable trend and the construction of high-level application-oriented universities has become a common pursuit of many local universities in China. This study focused on the basic concepts, goals and key tasks of construction of high-level application-oriented universities, pointed out that overall planning, focusing on key factors, integration of production and education, mechanism innovation and choosing pilot universities are the basic concepts of construction of high-level application-oriented universities. Based on a case study in Shanghai, this study found that “double-skilled” teaching staff should be improved, multi-level talent training system should be constructed and universities and enterprises should be integrated deeper.

Keywords—Application-oriented Universities; University Classification; Construction; Shanghai

I. INTRODUCTION

Guided by Xi Jinping's new era of socialism with Chinese characteristics, the spirit of the 19th National Congress of the Communist Party of China, and the “China Education Modernization 2035”, the “Proposal for Promoting the Development of University Classification to Implement High-Level Local Application-oriented Universities” thoroughly implement the decision-making arrangements of the Party Central Committee and the State Council on comprehensive education reform, and actively connect with Shanghai's construction needs, comprehensively implement the “Shanghai Deepening University Reform and Construction of High-level Local Universities Pilot Program”, in accordance with the requirements of Shanghai university classification management and local university transformation and development, further clarify the development direction of application-oriented universities, focus on key areas, build a discipline system that is well-known in engineering and coordinated development of multi-disciplinary development, and comprehensively enhance the ability and level of economic and social development and industrial transformation and upgrading of application-oriented universities.

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II. DEVELOPMENT OF UNIVERSITY CLASSIFICATION

In order to carry out the construction of “double first-class” universities, promote the classification development of higher education, the development of connotation and the improvement of service capabilities, the education department has issued the “Opinions on Promoting the Classification and Development of Ordinary Universities” to promote universities optimize the structure and connotative development. Universities are divided into four categories. It is understood that the “Opinions” guides the accurate positioning of universities, strives for innovation at different levels and in different fields, and enhances the ability of universities to serve national strategies and local economic and social development [1].

The “Opinions” are mainly based on the “National Medium- and Long-Term Education Reform and Development Plan (2010-2020)”, “Notice of the State Council on Printing and Distributing the Overall Plan for World-Class Universities and First-Class Discipline Construction”, “Opinions of the Ministry of Education on the setting up of higher education institutions during the 13th Five-Year Plan period” and other documents are formulated. The “Opinions” are guided by the needs of major national and local strategic developments, aiming at guiding the scientific positioning, connotation development, and characteristic education, comprehensively improving the overall level of higher education in all regions and serving the ability of economic and social development, thus accelerating the pace of “double first-class” construction.

The “Opinions” divides universities into four types: comprehensive research-oriented universities, applied research-oriented universities, application-oriented universities and skills-based universities, and clarifies relevant development goals and requirements.

Comprehensive research-oriented universities aim to build world-class or high-level universities. They serve the development strategy of the country, the major local needs and lead the development of society, focusing on the original innovative research and the cultivation of top-notch innovative talents.

Applied research-oriented universities aim at building first-class industry and first-class locality, with applied research and training of outstanding talents as important tasks, focusing on the needs of industry and local pillar industries, strategic emerging industries and social development, providing talent support and intellectual service.

Application-oriented universities aim at transformation and development, focusing on the application of technology, taking the application-oriented talents cultivation as the main task, strengthening the integration of production and education, and constantly innovating the synergy between production and education, the university-enterprise common education model, and enhancing students' ability to work and start businesses.

Skills-based universities are mainly aimed at creating national-level high-quality vocational colleges, and aiming at the development of service industry and promoting employment, so as to cultivate skilled talents engaged in production management services.

In order to better promote the development of university classification, a number of model universities will be built in various places. The administrative department of education will guide the rational positioning of universities and explore the mechanism of establishing differentiated resources by carrying out the construction of the classification development of universities. It is estimated that by 2022, the localities will basically complete a classification development system for higher education that is compatible with the needs of economic and social development, with clear categories, optimized structure, accurate positioning, and local characteristics.

III. BASIC CONCEPTS

The "Regulations on the Promotion of Higher Education in Shanghai" was officially implemented on March 15, 2018. As the first local law to promote the reform and development of higher education in China, the "Regulations" clarify that higher education should focus on cultivating talents, stipulating that the government supports safeguard measures, promotes the development of university classification, and ensures the steady growth of higher education investment and teacher income [2]. Therefore, it is imperative to build high-level local universities.

A. Overall Planning

The promotion of high-level application-oriented universities and disciplines should be coordinated to form a modern vocational education system with a combination of secondary vocational education, higher vocational education and application-oriented higher education. More concentration on the disciplines with urgent needs, outstanding advantages and distinctive features are essential.

B. Focusing on key factors

The development orientation needs to be clear by focusing on key areas, such as talent training mode, teacher team development, technical innovation and transformation of discipline professional group construction, modern university

governance system, so that the application-oriented universities can better adapt to and serve the needs of economic and social development [3].

C. Integration of production and education

Adhering to the principle of "resource sharing, complementary advantages, mutual benefit and common development", a new mode of cooperation between industry, university and research institutes should be actively explored. The new advantages of integration of production and education should be embodied, while the integration of production and education should be integrated throughout the whole process of personnel training, and be developed together with the industry to demonstrate a deep integration of exemplary professions.

D. Mechanism innovation

The management system and mechanism should be innovated to improve the internal structure. The relevant incentive and restraint mechanisms need to be established and improved to ensure the implementation of various support policies. A university internal control system is also significant, which strengthens self-regulation, self-discipline, and accepts supervision and guidance from higher authorities and all sectors of society.

E. Choosing pilot universities

Adhering to the principle of "pilot first, overall advancement", the application-oriented universities ought to become with clear orientation, clear reform ideas, and outstanding industry contributions. They are the forerunners in cracking the common problems encountered in the development bottleneck of new system mechanism and policy. One small step will be one giant leap to improve the overall development level of application-oriented universities.

IV. GOALS AND TASKS

A. Construction goals

Based on the international perspective and highlighting application-oriented higher education, these universities will be established as high-level multi-disciplinary universities of applied sciences, giving priority to the development of leading disciplines, in accordance with the idea of "relying on engineering, service engineering, leading engineering" to develop non-technical disciplines, deliver high-level applied talents to the industry, and playing an engine role in the development of industry technology. High-level application-oriented universities would be built that conform to the technological development of the industry and have certain international influence. China will build world-renowned specialty disciplines and provide technical and talent support for relevant industries to enter the world advanced level.

B. Key tasks

The application talent training mode needs to be optimized. The mode includes cultivating high-tech and high-skilled applied talents who have mastered vocational skills, advocated

professional credit, and demonstrated professional characteristics, and established a sound, full-process, all-round education system and quality assurance system. The mode promotes education and teaching reform and connotation construction to ensure the steady improvement of the quality of personnel training. The mode actively explores and innovates a diversified talent training model, enhances students' engineering practice ability and career development capabilities through the "engineering introduction" engineering master training model exploration, excellent engineer education training program, CDIO engineering education reform, and German FH education model. The development plan of the application-oriented talents would be expanded through the integrated design of the training plan, and efforts should be made to structure and integrate the application-oriented talents.

The construction of the "double-skilled" teaching staff should be strengthened. Focusing on the construction of the "double-type" teaching staff, academic leaders and innovative teams, aiming at improving teachers' comprehensive quality and innovative ability, optimizing the structure of teachers and building a team of teachers with high level, professional ability, and "double-skilled" teachers as the main body and adapting to the application-oriented talent training requirements. The recruitment process for teachers and lean toward candidates with practical work experience in the field of technology application and innovation should be optimized. The training of "double-skilled" teachers, and arrange professional teachers to receive training will be strengthened. A two-way appointment system for university teachers and enterprise engineering and technical personnel and high-skilled personnel should be established. Through the establishment of master studios and other initiatives, industry craftsmen, management elites, business backbones and other special professors or mentors will be hired [4].

Disciplines that lead the development of the industry are essential. Actively docking national strategies and local needs, carrying forward the fine tradition of working and learning, industry-university cooperation, developing the urgently needed disciplines in the industry and social fields, cultivating cross-integrated emerging disciplines, and upgrading traditional professional energy levels. Actively participating in international professional certification, actively participating in the formulation of domestic and international industry standards, and promoting certain industry standards to become international standards. Relying on high-level disciplines to create industry technical backbone training bases, it plays an important role in cultivating industry technology innovation talents.

A technological innovation platform creates demand for the service industry. Focusing on scientific research and feedback, the platform actively carries out scientific research in line with the needs of economic and social development and the layout and direction of university disciplines, and strengthens applied research and development. Relying on the research institutes, the application-oriented universities should gather research directions, enhance cooperation and promote the transformation of results, and provide professional technical services in the fields of electronics and automatic

control, mechatronics, computer and information technology, environmental engineering and new materials [5].

A scientific and rational modern governance system needs to be constructed. The system will strengthen the innovation of university management, build a university internal governance system that adapts to the integration of production and education, continuously improve the governance capacity and level to integrate existing educational resources, innovate and integrate the talent training mode, and give full play to the leading and central role and application skills of application-oriented universities. We also promote the formation of a modern vocational education system that is linked to the "vocational schools, vocational colleges and application-oriented universities".

V. SUGGESTIONS AND CONCLUSIONS

A. Adjustment and improvement of "double-skilled" teaching staff

The appointment and assessment system for the teaching staff should be improved, by establishing the teacher recruitment system that matches the application-oriented universities, enhancing the standards for the "double-skilled" teachers, and optimizing the proportion of teachers, researchers and technicians. More high-tech talents from industry enterprises such as masters with high attainments and prestige, senior technicians, technicians and equivalent personnel are in urgent need. The qualification system will be constructed to explore the evaluation of professional titles that meets the characteristics of "double-skilled" teachers. These points are very important when reviewing a teacher: taking the participate in the formulation of industry technical standards, participating in enterprise technology research and development, and going to corporate practice.

The teacher compensation system that adapts to the characteristics of application-oriented universities should be established. The system promotes the transfer of technology and the transformation of achievements in universities, the rewards for the transformation of scientific and technological achievements, the income for personnel used in scientific research projects obtained through open bidding, the introduction of high-level talents and the funds required for the team, etc. Besides, it promotes the reform of the internal salary distribution system and explores flexible and diverse forms and distribution methods of salary, such as annual salary system, agreed wages, and project wages. With a standardized social service management approach, a socialized vocational training for the backbone of technical skills training for industry enterprises will be carried out. The relevant income is used for the diversified distribution of high-level talents.

The technical innovation team with the participation of universities and enterprises should be established. Guided by solving key industry technologies, core processes and common problems, technical innovation teams in high-level disciplines are in urgent need. The team building implements the leader responsible system. The members are jointly participated by university teachers, enterprise technical

backbones and scientific research personnel. The team funds are composed of financial funds and enterprise funding.

B. Professional construction and multi-level talent training system

Disciplines with urgent needs, outstanding advantages, and distinctive characteristics need to be set up. Shanghai will promote the construction of majors in application-oriented universities, closely connect with the construction of Shanghai's "five centers" and "four major brands", and build a number of application-oriented discipline peaks with distinctive industry characteristics for industry needs and job requirements, and create a number of application-oriented majors with demonstration and leading functions [6].

It plays an important role in the system of connecting the various sections of vocational education to higher education. The innovative and applied talent training mode plays an important role in the talent training system that is linked to the "vocational schools, vocational colleges and application-oriented universities". Optimize the postgraduate training structure, actively declare the professional degree authorization point, and further expand the professional degree postgraduate enrollment plan. The proportion of graduate students in professional degree would gradually reach more than 75%.

C. Deeper integration of universities and enterprises

Strengthening the application of scientific research and the transformation of results, and realizing the transformation of university's scientific research system. Integrating with enterprises and research institutes to carry out technical services for small, medium and micro enterprises, and opening advanced technology transfer, application and diffusion paths to promote the transformation of scientific and technological achievements in universities. Exploring the establishment of a multi-evaluation mechanism with a focus on the actual contribution to industry development. Hosting or participating in the formulation of industry standards, and striving to become a national and international standard setter in relevant industries.

We need In-depth promotion of innovation and entrepreneurship education. the innovation and entrepreneurship education system should be established and improved, and integrate innovation and entrepreneurship education into the whole process of personnel training. With the goal of cultivating innovative talents with innovative spirit and practical ability, the universities should cooperate with enterprises to develop innovative entrepreneurship courses, introduce cutting-edge technology courses and teaching services for industry enterprises, and build a curriculum system that integrates innovation and entrepreneurship education with professional education. Extensively establish internal and external training bases and practice centers, and actively participate in the establishment of various innovation and entrepreneurship contests and practical project platforms.

Establishing a university-enterprise joint experimental training base and a new model of university-enterprise cooperation with deep integration. Efforts should be made to build key laboratories at the provincial and ministerial level, engineering technology research centers, collaborative innovation centers, and industry-university-research cooperation innovation demonstration bases. Efforts should be made to build a number of open high-level production, study and research collaborative innovation bases and experimental training bases for the whole city and the Yangtze River Delta, and vigorously enhance students' practical and innovative capabilities [7].

Constructing a university governance system that adapts to university-enterprise cooperation and integration of production and education. Improving the governance structure, the university committee composed of organizers, industry enterprises, experts in related fields, and representatives of teachers, attract enterprises to participate in university governance in depth, and form an effective mechanism for university-enterprise collaborative education and innovation. Attracting companies to deep cooperation with application-oriented universities. Quickly improving the training level of technical talents by co-organizing secondary colleges, jointly training talented talents, and jointly establishing research bases or training bases.

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