

“Three Views” of Transformation Development of Local Colleges and Universities in the Perspective of New Engineering Construction

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Abstract—The new economy is the foundation of new engineering construction, and the trend of new economic development such as the development of internet, the rise of innovative enterprises, the rise and development of new industries and intelligent manufacturing industries. It pushes colleges and universities to shift development train of thought in setting of disciplines, value orientation of talent fostering and talent training mode, so as to meet the talent demand in new technologies, new forms, new model and new industries under the new economic conditions. The local colleges and universities need to realize the coupling of education and the development of economy, root on the localization characteristics, set up the development view of classification, adhere to the cultivating the talents of meeting the needs of production site, penetrate the concept of users in the whole process of talent training, follow the three-dimensional integration of objective orientation, technical knowledge logic and demand of the educates on knowledge and skill in professional course, and cultivate students into the individual life with comprehensive personality strength and fully socialization.

Keywords—*new economy, new engineering, local colleges and universities, personnel for production site, classification of development*

I. INTRODUCTION

The development of higher education must follow the unity of academic logic and logic with politics, economy and culture. Theoretical thinking is an important tool for understanding the world and transforming the world. Engineering technology is the support of social development and can be transformed into real productivity. Its practicability, feasibility, economy and comprehensive

characteristics determine that engineering technology will definitely play an important role in the era of knowledge economy. Under the background of the flourishing development of the new economy, the prosperity and development of philosophy and social sciences and the strengthening of new engineering construction are mutually supportive, and the reforms leading to the development of higher education in China are developing in depth. The transformation and development of local universities is the strategic requirement of regional economic development for higher education. It is a comprehensive reform of the construction of adaptive new engineering talents from the perspective of system. Local universities must have their own "souls" in the process of development, and they need coordination of development, talent and curriculum.

II. THEORETICAL LOGIC FROM THE NEW ECONOMY TO THE NEW ENGINEERING

In the process of new economic development, technological trends such as big data analysis, cyberspace and virtual reality have greatly changed human thinking, production and lifestyle. Knowledge-based and highly-skilled jobs have increased significantly, and new formats have also made many new achievements. The business model requires the support of a large number of new composite talents with cross-border capabilities. Traditional engineering faces new challenges of adaptability issues, and new engineering construction emerges as the times require.

A. *The theoretical connotation and development trend of the new economy*

New economy is a cross-industry and cross-disciplinary concept. As Chinese premier Li Keqiang said at the press conference, "The coverage and connotation of the new economy is very broad, involving the first, second and third industries, not only refers to the emerging industries and formats such as 'Internet +', Internet of things (IoT), e-commerce in the tertiary industry, but also includes the

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intelligence in industrial manufacturing, manufacturing, large-scale customized production, etc." [1]

In the development path of the new economy, industrial chain integration occupies an important position. The "Internet +" industry innovation model requires a large number of innovative and outstanding engineering talents with cross-industry, interdisciplinary knowledge and capacity reserves. The group-based technological revolution in the new economic field has the characteristics of cross-integration of typical disciplines, and the engineering and scientific talents facing the new economy should also be matched with it, and have the ability to adapt to cross-border integration [2].

According to the survey and analysis, the development of China's new economy is mainly reflected in the development of the Internet, the emergence of innovative enterprises, the birth and expansion of new industries, the intelligentization of manufacturing industries and the "double innovation". The influence of network on economy leads to the change of thinking and mode first. Internet companies represented by Alibaba are constantly innovating in technology and development models, and their influence has reached every corner of the Internet in the world. It has a subversive impact on traditional industries, and technology, products, and business models are iteratively fast, and their transformation and upgrading speed is even faster than the time they spread and spread. The company represented by Huawei focuses on product and technology innovation, and truly realizes the innovation-driven development with an international vision, leading the development of China's manufacturing industry to information, intelligence and networking. As a traditional manufacturing country, high-grade computerized numerical control (CNC) machine tools and robotics industries have greatly improved production efficiency and product quality in the context of intelligent upgrades and smart factories. "Popular Entrepreneurship and Innovation" policy has fostered a new innovation ecosystem. The integration of talents, technology, capital and market has subverted the old road of relying solely on resources for development. Entrepreneurship has moved from the elite class to the grassroots class. Talents are the primary resource for the development of a strong economy, so there is an urgent need to develop "new engineering" to support the talent needs of the new economic development.

B. New engineering is an important support for establishing an engineering education system

The countries of the world have never stopped encouraging competition to enhance their comprehensive strength. A new round of scientific and technological revolution and industrial transformation are becoming the path for countries to try to lead other countries. Engineering changes the world, engineering education and industrial development have a close symbiotic relationship. Industrial upgrading and structural adjustment have pushed China's higher engineering education reform to the forefront of university transformation and development. According to

the data of the Ministry of Education, in 2016, the number of undergraduate students in engineering in China reached 5.21 million, ranking first in the world [3]. The quality of engineering education has also been greatly improved. It has already had a certain influence in the field of higher engineering education. The professional certification system for engineering education has achieved international substantive equivalence. These achievements have laid a good foundation for accelerating the construction and development of new engineering.

Scientific and technological progress is the logical origin of new engineering construction and engineering education innovation. The new engineering is strategic, innovative, systematic and open, representing the latest industry or industry development direction. The "new" in new engineering is embodied in three aspects [4]. The first is emerging, that is new and unprecedented disciplines, such as the disciplines facing future new technologies and industries that have been nurtured and expanded by some basic disciplines. The second is a new type of new discipline formed through the expansion of the connotation of traditional disciplines, the improvement of training target standards, and the innovation of training models. The third is a new discipline that is created by the cross-combination of different engineering disciplines. The "new" in the new engineering sciences will not only lead to the renewal of technology and the increase of human resources reserves, but also inject new elements into the development of technology culture.

"Fudan Consensus" of new engineering construction puts different requirements on different types of universities in the construction of new engineering [3]. For local universities that do not have the advantages and resources of universities with comprehensive engineering advantages, "Fudan Consensus" proposes that it should play a supporting role in regional economic development and industrial transformation and upgrading, in terms of professional construction and personnel training and local pillars.

III. NEW ENGINEERING CONSTRUCTION IS A RATIONAL WAY FOR THE TRANSFORMATION AND DEVELOPMENT OF LOCAL COLLEGES AND UNIVERSITIES

The transformation and development of local colleges and universities is essentially the problem of structural reform of the supply side of higher education. This is not a change of "class" but a change of "type", because transformation does not change the characteristics of its professionalism and higher nature, but has practical characteristics [5]. From the perspective of the history of higher education, a considerable number of local colleges and universities are products of planned economy and a political design. However, with the changes in the economic system, especially after the popularization of higher education and the gradual popularization, the old management system has seriously hindered the development trend of colleges and universities following

the world's higher education. The rigid discipline and professional settings have made the quality of talent training unable to meet the needs of economic and social development. The talent supply market has experienced serious structural imbalances. It is predicted that in the "Made in China 2025" talent gap, the total talent shortage in the top ten key areas of manufacturing will reach 30 million people [6].

A considerable part of the local colleges and universities have been upgraded from the original normal colleges and universities, maintained the tradition of teacher education, and continued to play a role in the pre-service training of teachers. Another part of the local colleges and universities have been transformed into comprehensive universities after years of development. Where is the direction of transformation for this part of the universities? The organizational performance of development of this large number of colleges and universities is related to the self-renewal ability of higher education, and it is related to whether the entire higher education can truly adapt to and lead the local social and economic development.

According to "Fudan Consensus", the "local" characteristics of local colleges and universities determine that in the process of development, it is necessary to optimize the discipline professional structure, strengthen the advantages and special disciplines, pursue dislocation development in professional settings and avoid competition with key colleges and universities. The transformation and development of local colleges and universities in the construction of new engineering can't be "waited for", and it is necessary to actively seek change, actively meet the needs of local economic and social development and the requirements of technological innovation of enterprises, and integrate and utilize local resources. Deepen the integration of production and education, and cultivate technical and skilled talents with rich industry background knowledge, strong practical ability and competent development needs of the industry, and play a supporting role for regional economic development and industrial transformation and upgrading.

In theory, the transformation of local colleges and universities into applied colleges and universities, the development of new engineering is the pursuit. The important indicator that applied colleges and universities are different from research-oriented colleges and universities is the orientation of running. Its development is based on the cultivation of vocational skills. Its most important task is to meet the current and future development needs of industries. Engineering talent training is an important part of the cultivation of applied talents. Engineering education takes comprehensive knowledge such as technical skills as the main learning content, and its goal is to cultivate the engineering practice ability of the educated person to have the planning, decision-making and design required for the engineer profession [7]. In a broad sense, engineering education is jointly undertaken by universities and various vocational colleges. In the actual

development of education in China, local colleges and universities are the main body of engineering education.

The discipline development status of engineering is subject to the occupational field at the practical application level. The professional development of the colleges and universities that matches the job requirements can effectively promote the scientific and technological progress in the relevant engineering field, and the vocational skill is the application domain of the engineering. Applied talent training and engineering education, although belonging to different fields, have a certain degree of homogeneity. The talent training target of applied colleges and universities points to the talents of engineers in the professional and technical fields. In the era of knowledge economy, more talents are directed to interdisciplinary fields. Both of them emphasize the meaning of practical technical skills and focus on developing the ability of educates to solve problems in specific career situations. Engineering education adopts three forms of "production", "study" and "research" to deal with scientific knowledge and skills. These three forms are logical starting points. "Study" is the knowledge transfer, "production" is the application of technical skills, and "research" is the R&D innovation and transformation of technical skills.

IV. "THREE VIEWS" OF LOCAL COLLEGES AND UNIVERSITIES IN THE PROCESS OF TRANSFORMATION AND DEVELOPMENT

The key colleges and universities undertake some national tasks, and the national strategic overall situation is observed. In the new engineering construction, their focus is on new technologies and new industrial development, strategic emerging industries and high-grade manufacturing. In the process of new engineering construction, local colleges and universities are required to change the concept of development, simply pursue academic performance and return to relevance to practice from the previous follow-up key colleges and universities and from discipline logic to cross-border integration, establish the development direction of training production talents. In the professional curriculum action, local colleges and universities must adhere to the purpose orientation, pay attention to the logic of technical knowledge, pay attention to the cultivation of students' comprehensive personality strength, and be committed to responding, participate in and solve the problem of talent demand in local economic and social development, and build a community of destiny in the integration of production and education.

A. Establishing the development concept of classified construction in colleges and universities

Transformation is the need for high-quality skilled personnel in the transformation and upgrading of industrial structure. The transformation of traditional industries into high-tech and high value-added industries is the only way to transform industrial structure. Local colleges and universities must be soberly aware that it is impossible to have huge financial support from governments like key

colleges and universities, and it is unlikely to undertake scientific and technological research related to the country's major development strategies, so must firmly adhere to the application-oriented and localized university orientation, not only to comply with the trend of new economic development, but also to be close to the frontier areas and core needs of local economic and industrial development, and to take care of the technological innovation needs of first-line enterprises. It is necessary to cultivate talents that meet the needs of the local and future economic and social development, and cultivate talents based on local innovation and entrepreneurship. Local colleges and universities should seek to become local common technology gathering and promotion centers and local new technology research and development centers to adapt and promote local industry development and transformation and upgrading. Strive to be the spokesperson of local civilization and become a cultural totem that local governments, society and people take pride in. Local colleges and universities should guide teachers to increase the openness and integration of local industries in the professional development, work hard in the professional construction, and advance to the "low-competition and non-competition areas" to do what they are good at [8].

Local colleges and universities in the construction of new engineering, do a good job of localization but do not reject internationalization, they must judge the new strategy of engineering education in developed countries, and actively introduce excellent engineering and scientific talents, engineering management talents and engineering education teachers from developed countries. In short, in the process of transformation and development, local colleges and universities should examine the universities' education and development with a broad international perspective, listen to the opinions of all parties with an open mind, and absorb the information from various industries with an open mind to make the colleges and universities become the carriers of local culture and the creators of engineering and technical culture.

B. Adhering to the concept of talent training to meet the production site

The process of talent cultivation is the process of providing products for the talent demand market. As a supplier, colleges and universities should implement the concept of users throughout the entire production organization. The entire organization of the supplier itself and the operation and operation of the organization fully meet the requirements of users. Local colleges and universities with regional resource advantages should do something about the value orientation of talent cultivation, independently explore new engineering paradigms, and take industry demand as the guide, shift from professional division to cross-border cross- integration, take the need to cultivate production site talents as an important goal. The demand for talent is an important goal in pursuit. With the goal of the adjustment and transformation of the local industrial structure, timely capturing the new characteristics and new trends of industrial development, cultivating

applied engineering and technological innovation talents who can get in touch with local enterprises and the scientific and technological talents who serve regional economic and social development.

Cultivating site engineers is the goal of the cultivation of talents in engineering education of local colleges and universities. Through the production process of on-the-spot cultivation, cultivating students' many sustainable development capabilities and literacy represented by innovative ability can transform the core thinking of engineering design into material form in engineering practice, serving the relevant engineering profession in the form of first-line skills. The advantage of colleges and universities lies in the richness of innovative intellectual resources, while the advantage of enterprises lies in their keen market awareness. The exchange of information and resources between the two sides can promote the scientific research and talent cultivation of local universities. Local colleges and universities should improve the education system of "creative-innovation- entrepreneurship" talent cultivation, carry out technological innovation and development of bottlenecks, and carry out industrial incubatorization of technological innovation by building a business incubator base and specialized maker space, thus forming a win-win platform for the collaborative innovation.

C. Following the three-dimensional view of professional course action

According to the traditional logic, scientific discovery promotes technological breakthroughs and promotes the industrial revolution. However, this development logic has undergone fundamental changes in the era of knowledge economy, and there is no longer a fixed relationship between the first and the second. It is necessary for local colleges and universities to establish an industrialized teaching department to provide organizational guarantee for interdisciplinary cross-training of engineering talents. It is necessary to adhere to the purpose-oriented nature of personnel training, strengthen the investigation of the demand for engineering science and technology talents in industrial development, do a good job of stock adjustment, update and transform traditional disciplines, and strive to develop at the high end of the value chain. The professional curriculum objectives are consistent with the characteristics of regional economic development. The teaching content is based on the professional ability requirements of field engineers, and efforts are made to simulate the actual production line of engineering.

The goal of engineering education is to return to the site, so the needs of technical knowledge should be fully considered in the construction of new engineering. The talents training of local colleges and universities should emphasize the logical system of technical knowledge, completely bid farewell to the logical orientation of subject knowledge, construct the curriculum knowledge system according to the work process, and grant the students the theoretical system and knowledge view and the logical clue

between knowledge required for the position of the on-site engineer [8]. According to the construction logic of the work process knowledge, the professional basic knowledge is rationally integrated, the professional knowledge or discipline of the technical knowledge is eliminated, the technical knowledge is accumulated, and the knowledge transformation ability is developed.

According to the theoretical logic of people's all-round development, in the construction of new engineering, it is necessary to observe the development needs of the knowledge and skills of the educated. Attention should be paid to improving students' adaptive ability and migrating technical skills and methodological ability that keep pace with the times. Cultivate students' comprehensive personality abilities, form a comprehensive personality force, learn to do things, and know how to behave, because good professionalism and professional ethics are not only the foundation for the future, but also the foundation for adapting to the needs of social life. It will enable them to play a leading role in the future social life.

V. CONCLUSION

The focus of local colleges and universities is on teaching. Under the general trend of new engineering construction, local colleges and universities must continuously explore new ideas of engineering education, new structure of disciplines, new models of personnel training, and new systems of education and teaching. In the process of transformation and development of local colleges

and universities, it is necessary to take the courage of the characteristics of the development of science and technology in the new era and the discipline of professional disciplines, and actively become the important provider of talent demand for new economic development.

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