

Chinese Characteristics "Double Ternary System" Vocational Education Theory

——Zhuhai City Polytechnic Innovative Exploration

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Abstract. Since founded in 2004, Zhuhai City Polytechnic actively explored the ternary jointly built specialties by industries, colleges and enterprises. After 7 years practices, in 2011, it took a brave research and innovation towards "Double Ternary System" vocational education mode, which consists of 'government-college-enterprise' and 'industry-college-enterprise'. On 19th April, 2016, 'China Education Daily' published an article by Liu Huaqiang, president of Zhuhai City Polytechnic named 'How Should Higher Vocational Colleges 'Precisely' Optimize Professional courses--- Thinking and exploration on Chinese characteristics 'Double Ternary System " Vocational Education Mode '. The article puts forward 'Double Ternary System' Vocational Education Mode. In order to better, comprehensively and systematically understand the formation and development, main content and practical effects of "Double Ternary System" Vocational Education Mode, today we outline Zhuhai City Polytechnic's "Double Ternary System" Vocational Education Mode.

The Formation and Development of "Double Ternary System"

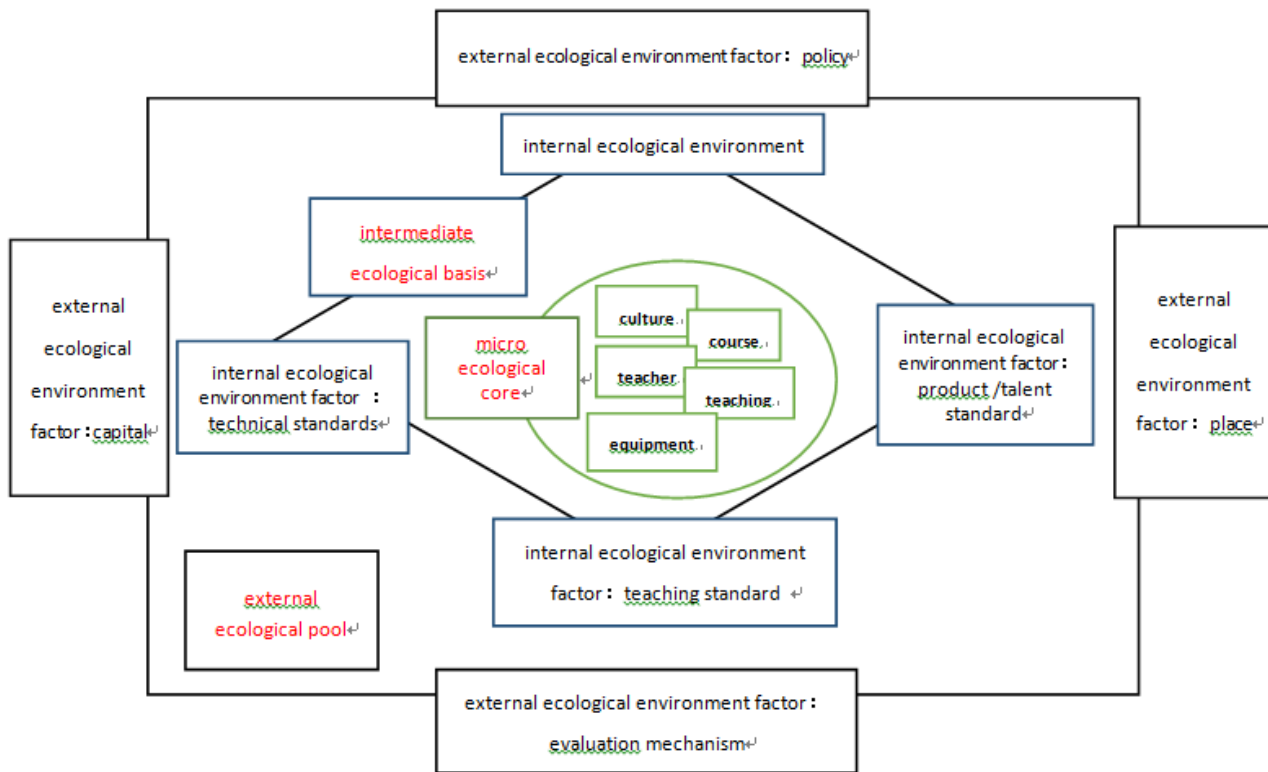
The Formation of "Double Ternary System" Vocational Education Theory. Background. Since early 2000s, Chinese higher vocational education stepped in to express development period, while Chinese economy accelerated its deep transformation. With the new industrial challenges of the third technological revolution, China need urgently and widely develop higher vocational education to support its economy structure transformation. Every industries face a huge demands of technical and innovative talents, while the quality of current higher vocational education cannot reach the target. With the evaluation of higher vocational education in 2003 and National Demonstration Colleges program since 2005, a major issue raised by most higher vocational colleges, which is how to enhance the connotations construction, and how to reform and innovation of colleges system and talents cultivation. Colleges widely cooperate with domestic and overseas to explore pre-order, factory in schools, or schools in factory's talent cultivation. But still we need a long-term and fundamental solution to ensure the cooperation between colleges and enterprises.

Practical basis. The surging jointly cooperation between colleges and enterprises, industry and students among all the country wide higher vocational colleges comes along with all kinds of exploration of reforms and talent cultivation, which also bring lot of research cases for Zhuhai City Polytechnic. Zhuhai City Polytechnic has set up a 'Double Ternary System' reform and innovation team, deeply studied all kind of higher vocational education theories that Represented by the German "dual system" vocational education series theory. With thoroughly practices, analyzing the deeper reality, the unremitting exploration bring a solid foundation for our finally theory formation of 'double ternary system'.

Theoretical basis. The purpose of higher vocational education is to provide high quality skilled talents, while the ecological factors will rely and interact with each other. By analyze the colleges, government, industry, enterprise four factors, and research from micro, meso and macro three levels, we can explore the viable model of talent cultivation under education ecosystem. Micro level means ecological core built by enterprise and colleges, meso level is the ecological basis built by industry, colleges and enterprises, while macro level is the ecological pools by all other external factors. This three level jointly cooperate and promote the practice exploration of double ternary system.

In German, the dual system by enterprise and colleges get legislation support. There is a gap to imitate its dual system to China, which include requiring government policy support, lacking law to define the cooperation, and the low ambition participating of enterprise and colleges. Zhuhai City Polytechnic first comes with double ternary system, the theory combined 'government-colleges-enterprises' and 'industry-colleges-enterprise'. Practices proves it is a successful localization exploration of German dual system. Figures 1 shows the details of double ternary system.

"Double Ternary System" Personnel Training Ecosystem Figure:



The Development of "Double Ternary System" Vocational Education Mode Theory. The exploration of "Ternary Co-construction". Since founded in 2004, Zhuhai City Polytechnic has actively been exploring the specialties built by industry, schools, and enterprises ternary cooperation jointly. Due to the big number of SMEs (small and medium-sized enterprises) and the active industry organizations in Zhuhai City, Zhuhai City Polytechnic took the lead in exploring the personnel training model of Ternary Co-construction (industry-college-enterprise), and succeeded in declaring teaching reform project of Guangdong Education Department on "The Research and Practice on the reform of Ternary Mode in Higher Vocational Education". Our secondary school — Engineering and Information School has been chosen as the pilot school in 2005, whose successful experience has been widely promoted in 2008. Then we have established cooperative relationship with 19 industry organization, including Zhuhai Chamber of Commerce of Importers & Exporters, Zhuhai Tourism Association, Zhuhai Chamber of Commerce of Logistics & Purchasing etc. And we have launched 3 industry organizations: Zhuhai Association of Vocational Education and Adult Education, Zhuhai Association of Social Work, Zhuhai Association of Automation. The initial effects have been achieved in the exploration of "Ternary Co-construction".

A shift from "Ternary System" to "Double Ternary System". Learning the German "dual system" has a long history in Chinese vocational schools. Combining the school-running system and mechanism of college-enterprise, the personnel training model has been widely spread. While there are still many problems existing in the practice of "college-enterprise" cooperation, for lack of the government-led policy, the legal deficiency of college-enterprise cooperation, the "enthusiasm gap" in enterprise participation, and the difficulty of meeting the regional economic demand of high-qualified talents etc, so are existing issues in Zhuhai City Polytechnic. Therefore, based on the

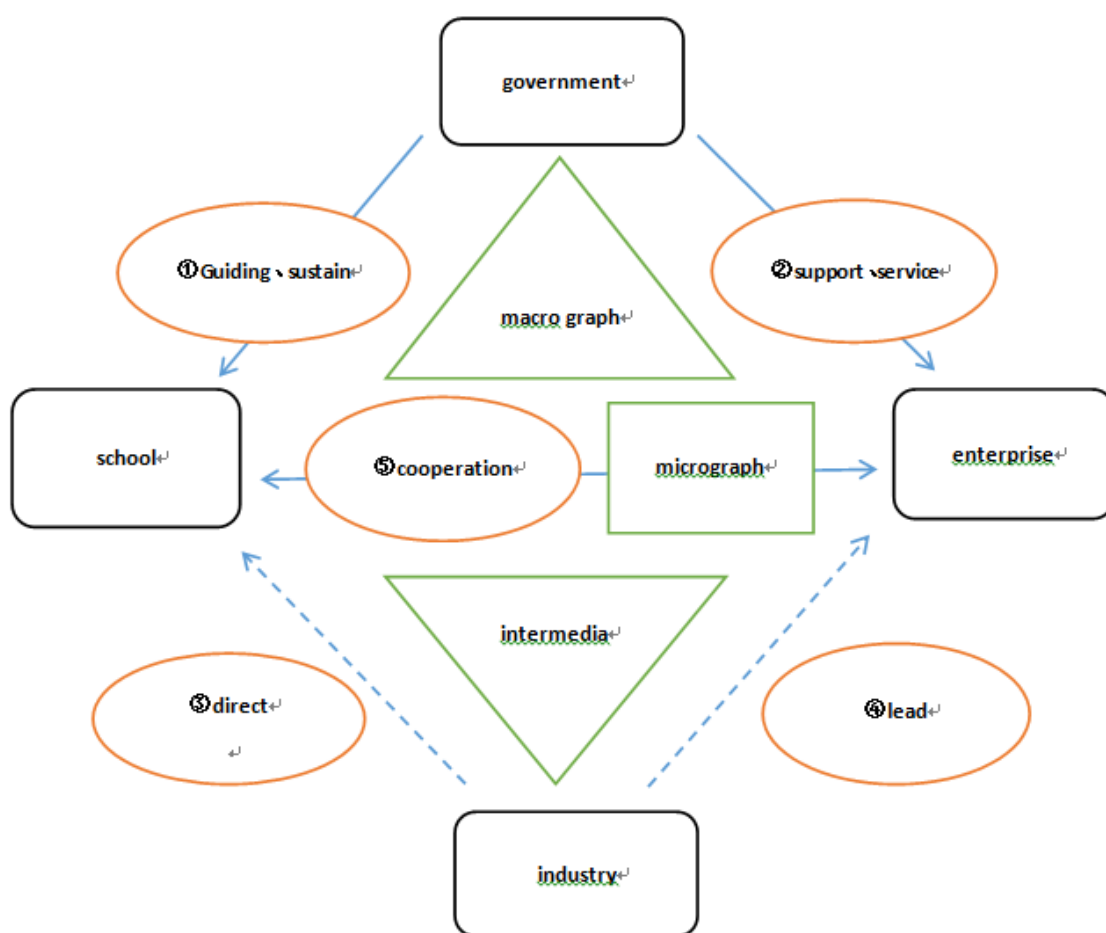
former "Ternary Co-construction", and in order to solve the problems in school-enterprise cooperation and explore the fine personnel training model to meet the need of transformation of the regional economic growth model and adjustment of industrial structure, we took a brave research and innovation towards "Double Ternary System" vocational education mode, which was consisted of "government-college-enterprise" and "industry-college-enterprise" in 2011. Thus breaking the bottleneck of "Dual System" in China, integrating the merits into China, and becoming the unique vocational education mode with Chinese characteristics.

The Main content of "Double Ternary System" Vocational Education Mode Theory

"Double Ternary System" Vocational Education Mode includes the "government, college and enterprise" (Namely the government-led, to college as the main body, enterprise as supporting) school-running mode and the "Industry, college and enterprise" (Namely, guided by the industry, to college as the main body, enterprise as supporting) personnel training model, which core idea is to achieve vocational education with Chinese characteristics "Ternary interaction, collaborative innovation, serving the local, replenishing each other, supporting each other."

This innovative concept of vocational education also reflects the open vocational education mode running structure of "the fusion of production and education, Cooperation of colleges, enterprises, combination of work and study and combination of knowledge and action". It consists of macro Vocational Education Association, medium level school council, micro teaching steering committee and professional guidance committee of three running level. Each level forms different work paths, respectively, and plays a leading, guiding and the main body different functions. Macro-level policy guidance, "government, college and enterprise" three-factor linking, to integrate resources; mesosphere industry norms, docking industry, "Industry, college and enterprise" three-factor fusion; micro-level school-enterprise interaction, the depth of cooperation, the entities construction. The three participating sides accommodate each other, support each other, promote together, innovate collaboratively, and integrate into one body, in order to form an effective mechanism system. See Figure 2.

Cooperative Relationship Among Government, Industry, Enterprise and College Principle Figure:



The main contents of "Double Ternary System" include the promotion of higher vocational school-enterprise cooperation, work-integrated learning Five Theories and Seven Operating Mechanism. the Five Research Theories are "Double Ternary System" Vocational Education Mode Theory, "Double Ternary System" Talent-cultivating Objective Theory about Higher Vocational Professional Core Competencies, "Double Ternary System" Collaborative Innovation Professional Development Theory, "Double Ternary System" Multiple Structure Construction Theory of the Teaching Staff, and "Double Ternary System" Information Technology Platform Theory. the Seven Operating Mechanism is as follows: the Safeguard Mechanism of Talent Cultivating and Managing Jointly, the Specialty Coordination Mechanism of Planning and Construction, The Personnel Training Cooperation Mechanism, The Educational Resources Mechanism of Optimization and Integration, The Talent Exchange Mechanism, The Sharing Incentive Mechanism of Mutual Benefit and Win-win Outcome, and the Restriction Mechanism Shared Management Risk and Social Responsibility. As the highest decision-making body in higher vocational colleges, "Double Ternary System" School Council abides by the principles of voluntary participation, equality and mutual benefit, accrual accordingly, the two-way interaction, collaborative innovation, and common development, with a focus on education resource optimization, discipline construction professional planning, talent exchange, production-study-research cooperation, training, certification, etc. to establish quality and efficient collaborative innovation mechanism.

The implementation of the "Double Ternary System" mode path. Implementation of. "Double Ternary System" mode is to solve educational system and mechanism bottleneck problems in the process of college-enterprise cooperation practice. It is the embodiment of the essence of the school personnel training mode. The mode is not a simple "government, industry, college, enterprise" a quad combination, but at different levels, organic fusion and innovation cooperation by the path. "government, college and enterprise" is the premise and foundation, In the face of domestic vocational education policy questions such as lack of guidance, strength and legal college-enterprise cooperation legislation, For higher vocational education national legislation, government policy,

optimize the environment of vocational education to provide realistic platform and power, it solves the problem of vocational education to cultivate what person, again from the deep solves the problem of the integration of production and education, promoting service ability of the economic and social development in school. "Industry, college and enterprise" is the key and the gripper, from the micro level ,it solves the problem that enterprise enthusiasm participating in vocational education is not high, promotes the ability of the school which professional services industry. It has been clear about the higher vocational education personnel training path. It has figured out how to cultivate much-needed high technical skill talented persons issues. The industry of "Industry, college and enterprise" is the guidance ,which has solved the problem of guiding the professional orientation in the medium level. Enterprise is supporting function and it solves the micro level professional standards and curriculum standard docking problem. "government, college and enterprise" will provide policy, build platform. "Industry, college and enterprise" is responsible for the implementation and execution. At the same time it will put the cooperation problems and difficulties encountered in the feedback to the "government, college and enterprise" level, which will provide guidance and help. The two promote each other, support each other. Through "government, college and enterprise" and "industry, college and enterprise" synergistic integration different levels, paths, we cultivate the compound ,development-oriented, and innovative technology skills talents, who are suitable for enterprise technological innovation and industrial transformation and upgrading, which will promote the overall quality of the higher vocational education.

See Figure 3. : "Double Ternary System" Mode Figure



The Effectiveness of "Double Ternary System" Vocational Education Mode

The school actively explored "Double Ternary System", and effectively improved the level of professional connotation construction. Schools adapted the industrial planning of the Pearl River in the West Bank, re-integrated teaching resources in the construction of electronic information, mechanical and electrical engineering, tourism management, logistics management, social work five professional groups, strengthened yacht decoration design and craft and other special projects of Sino-German cooperation construction, prepared for the development of marine engineering equipment manufacturing, aerospace, air conditioning and refrigeration the new specialties, etc. related to industry (industry). The school worked together with Gaolan Port Economic Zone to create "government-school-enterprise deep cooperation experiment circle", in collaboration with high-end services business founded "Aviation and marine engineering school", the creation of Long-Lon tourism management courses, orientation courses of Green enterprise safety technician, Green experimental test member orientation training courses and other 17 enterprises "title" classes.

According to the program actual situation, guided by the "Double Ternary System", the school developed a specific mode of professional education, deepened the professional teaching reform. Meanwhile Students practice environment and "Double teachers" structure obviously improved. Students post professional ability level has improved significantly. The school markedly enhanced its capability of university-enterprise cooperation professional social services.

The school has actively established "the Four Collaborative Innovation Platforms" of "Double Ternary System" Vocational Education Mode, which play an important role for implementing Zhuhai innovation-driven strategy. The school docked zhuhai social governance, Zhuhai High-tech Zone smart grid industry, manufacturing SMEs , Zhuhai Gaolan Port Economic Zone, has established Zhuhai economic and social development and social management, Zhuhai smart grid applications technology, mechanical and electrical equipment and technology in Zhuhai, southern China port coal collection and distribution four collaborative innovation Centers, servicing for management innovation and technological innovation. Landmark achievements such as economic and social development and social management innovation center ,which became Zhuhai social management innovation research base, its issue of "Zhuhai social work personnel Investigation Report" committed to the Central Organization Department was elected to the Guangdong provincial decision-making reference corpus. Intelligent grid innovation Centre bore the " Zhuhai smart grid industrial planning and implementation programs (2013-2020)" formulating work, promoting the development of "photovoltaic installation and commissioning work occupational skills standards (draft)". Port coal innovation center presided over the West River golden waterway investigation and so on. The school has built a wide range of innovative service, communication and contact platforms, which built the bridges for collaborative innovation between schools and the community.

Practice has proved that "Double Ternary System" is the sinicization of German "dual system". It is the improved and localized mode of the German "dual system", which has operability and replicability in China..

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