Research on the Training System of International Chinese talents in Hydropower Engineering Based on China-Africa Cooperation–Taking GPWE Mutare Poly College of Engineering and Technology as an Example

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Abstract: Under the "Future Africa-China-Africa Vocational Education Cooperation Plan", Guangdong Polytechnic of Water Resources and Electric Engineering and Mutare Polytechnic in Zimbabwe established the "GPWE—Mutare Poly College of Engineering and Technology" to jointly train African hydropower technical talents. Through the cross-border segmented training mechanism, the two-school cooperative enrollment, the modular training process management, and the construction of a country-specific training system, the training quality of international Chinese talents in hydropower projects can be improved to meet the development needs of new quality productivity, and then provide a certain example for the training of international hydropower talents in the Belt and Road countries.

Keywords: China-Africa cooperation; Hydropower projects; International Chinese talents; Training system

1. Analysis of the Current Situation of Foreign Students

According to statistics from the website of the Ministry of Education, in 2014, a total of 377,054 foreign students from 203 countries and regions studied in 775 institutions of higher learning, scientific research institutes and other teaching institutions in 31 provinces, autonomous regions and municipalities directly under the Central Government, an increase of 20,555 people over 2013, an increase of 5.77 % (the above data do not include Hong Kong, Macao and Taiwan). Ranked by province and city, Guangdong Province ranks sixth, with a total of 21,298 overseas students.

As the first expansion member of the national platform of the China-Africa Vocational Education Consortium, Guangdong Polytechnic of Water Resources and Electric Engineering signed a "Memorandum of Cooperation" with the Mutare Polytechnic in Zimbabwe in 2024, and in January 2025, it was inaugurated as the "GPWE—Mutare Poly College of Engineering and Technology". The college is jointly built by the two schools, aiming to jointly cultivate local hydropower technical talents in Africa and serve local enterprises.

2. Training Mode and Enrollment

Students need to pass the Zimbabwe NC (National Certificate) Certificate Examination (Primary Vocational Qualification Certificate) to participate in the program. The form of learning is full-time academic education.

The training mode is the '2 + 1'transnational segmented training mechanism, which is trained in Zimbabwe for 2 years (one semester before coming to China, Chinese school carries out online Chinese teaching simultaneously) and 1 year in Chinese school. Among them, the training of our school belongs to the middle stage training, and the students need to return to their country to practice after the study. The graduation requirement is that you must pass all the course examinations offered by the two schools and the National Diploma (ND) certificate examination (Advanced Vocational Qualification Certificate) before you can obtain the graduation certificate of the two schools, that is, the Double Diploma.

Enrollment adopts 'two schools cooperate with two stages. Zimbabwe first organizes students to register, review materials, notify qualified materials to participate in the selection examination, and determine the shortlist. Our school carries out a semester of online Chinese teaching for the short-listed students, and then carries out a Chinese proficiency test. Finally, according to the comprehensive proportion of Chinese scores and students' professional course scores, the final list of students admitted to China is determined.

3.Modular Training Process Management

A total of 30 international students were enrolled in the first session, including 15 students majoring in Hydraulic Engineering and 15 students majoring in power supply technology. The training goal is to cultivate compound technical and skilled talents with practical ability, craftsman spirit and information literacy according to different professional requirements and enterprise needs.

In order to standardize management, the school has set up a special class for international students to implement modular fine management. The College of International Education is responsible for the admission of international students, co-ordination and coordination of various affairs. Each secondary college is specifically responsible for the daily management and teaching of international students. Each college has full-time counselors and class teachers for international students. Counselors are responsible for life management, and class teachers are responsible for teaching management.

In terms of life management, counselors determine the number of assistant head teachers (assistant classes) according to the proportion of male and female students in various majors. Then, the assistant class is divided into groups, each group is responsible for one day on duty in turn, mainly responsible for the specific foreign student affairs and bed check assigned on the day. Counselors regularly meet with the assistant class to find and solve problems in time.

In terms of teaching management, the head teacher is responsible for following up the course progress, learning, homework, practice and training of foreign students. The head teacher regularly holds class meetings with foreign students to build class atmosphere and study style.

4.Country-specific Training System

According to the social environment, school education background and the characteristics of students in Mutare, Zimbabwe, we have developed a country-specific training system based on 'localization' and 'modernization', guided by 'enterprise needs' and centered on 'student learning'.

(1) Construction of "Chinese + hydropower engineering" international professional curriculum

system and training program

New qualitative productivity is a new economic concept with innovation as the keynote, strategic emerging industries and future industries as the carrier, and new production factors such as data and computing power as the key. It can be said to be a productivity leap caused by a new round of digital technology change. New quality productivity requires hydropower talents not only to master engineering technology, but also to have the ability to apply digital tools, such as AI-aided design, new energy technology, green technology knowledge, and the ability to disseminate technical standards through Chinese. The training goal needs to be changed from a single technical type to a 'technology + language + innovation' compound type.

We learn from the concept of "new engineering" integrate discipline resources such as engineering, linguistics, information technology, and cross-cultural communication, break the traditional single-disciplinary training model, establish an interdisciplinary and practice-oriented curriculum system, and enhance the adaptability and competitiveness of talent training. Courses such as "UAV mapping", "electronic technology" and "virtual simulation" have been set up.

While studying hydropower in our school, students also need to learn Chinese and Chinese overview and culture courses. It highlights the applicability and complexity of the 'Chinese +' talent training program. The study of professional courses includes theory, practice, enterprise visits and on-campus training. At the end of the one-year study, students need to return to their home country to practice in local enterprises or Chinese-funded enterprises.

(2) Implement the training mode of 'three-level' and 'multiple tutorial system'

The 'three-level' is 'professional ability + skill teaching + enterprise assessment'. International students study relevant theoretical courses in the local area, obtain the corresponding primary vocational qualification certificate, come to our school for 1 year of practical skills course learning, return to the country to practice in local enterprises or Chinese-funded enterprises, enterprises assess students' practice, pass the assessment, before they can participate in the advanced vocational qualification certificate examination.

Multiple tutor system: domestic tutor + tutor in China + enterprise tutor. Each tutor is responsible for guiding three students, and the three tutors of each student form a 'tutor group', which is convenient for communication and exchange between tutors, timely understanding of the situation of students at each stage, so as to guide students more effectively. Generally, in the initial selection, the students are divided into three groups. Each group is first equipped with national tutors, then equipped with tutors in China after coming to China, and equipped with enterprise tutors in the internship stage. The three tutors form a 'tutor group'. The system not only guides students, but also closely links domestic universities, Chinese universities and enterprises, promotes academic exchanges, technology sharing and talent co-education, and lays a solid foundation for long-term international cooperation.

This model constructs a closed-loop training system of "Chinese and foreign linkage, school-enterprise coordination and whole-process guidance," aiming at cultivating compound and applied talents who understand international standards and master China's advanced technology. It ensures the hard power of students' skills through 'three-level', and guarantees the soft power of students' growth support through 'multi-tutor system', and finally realizes the goal of cultivating high-quality international technical and skilled talents, which is of great value to students, cooperative colleges and enterprises.

(3) Establish a dynamic, traceable personalized mechanism

Through the establishment of e-learning archives, a dynamic, continuous and traceable personalized growth record and support mechanism can be constructed. E-learning archives are the 'digital blood' throughout the entire training model. It organically connects the various stages of the "three-level" and the various roles of the "multi-tutor system" into a whole, ensuring the continuity of student growth, the accuracy of tutor guidance and the synergy of the training system. It is the core infrastructure to ensure the efficient and high-quality operation of the innovation model.

The so-called "e-learning file" means that students report their learning situation to the tutor at a fixed time every month. The tutor gives guidance, records and registers the student's report, and forms the student's personal learning file. The learning archives of each stage can be transmitted to the tutors of the next stage of learning, so that the tutors of the next stage can understand the students, and finally form the final e-learning archives of the student multi-tutor system.

The core advantage of this mechanism lies in the close combination of process evaluation and tutor collaborative guidance, which realizes the refinement and systematicness of talent training. For students, it can promote their reflective learning and personalized growth. For the tutor, precise guidance and efficient coordination can be achieved. For the training system, it can guarantee the quality of training and continuous optimization.

(4) The implementation of concentric, dynamic evaluation system

Establish a normalized monitoring mechanism. The first circle of the concentric evaluation system is the dynamic evaluation system oriented by industrial demand, which trains suitable talents according to the needs of local enterprises and China's non-enterprises. It introduces industry and enterprise evaluation indicators (such as technology application ability, project adaptation cycle) to ensure the synchronization of talent training and industry technology iteration.

The second circle of the concentric circle evaluation system is the three-dimensional index system. It includes enrollment quality dimension, training process dimension (curriculum implementation quality, teacher construction effect, student development monitoring, management service efficiency), and achievement output dimension (academic achievement, employment quality, brand influence, cultural communication).

Periodic evaluation is carried out through diversified evaluation subjects. The evaluation subjects include school-enterprise joint evaluation group and students. The participation of technical experts from Chinese-funded enterprises was introduced, and the dynamic monitoring of students' satisfaction was carried out.

(5) Build a diverse international faculty

In view of the shortage of 'double-qualified' teachers with both hydropower engineering background and Chinese teaching ability, the school has introduced international Chinese teachers, formed a 'Chinese + hydropower' teacher team, and cooperated in the development of bilingual teaching materials and digital resources. Encourage Chinese teachers to visit and study in enterprises, and regularly carry out language teaching and training for hydropower teachers.

Joint enterprises, establish school-enterprise workshops, and jointly build a high-level teaching staff. The school hires senior technical personnel as tutors, and school teachers and enterprise tutors form an alliance to form a school-enterprise work team. Through the tutor work team model, improve the practical ability and teaching ability of school teachers.

Through the policy of "bringing in and going out," we employ well-known professors from first-class universities at home and abroad to do special reports, and learn the advanced teaching experience and the latest scientific research achievements of well-known experts at home and abroad.

Encourage excellent teachers to go out, communicate more, and actively participate in academic conferences and advanced studies at home and abroad.

5.Development and Prospect

With the successful opening of the first batch of 30 Zimbabwean students from "GPWE—Mutare Poly College of Engineering and Technology" the internationalization practice of hydropower engineering vocational education in higher vocational colleges has achieved important initial results. This project not only responds to the national strategy of the "Future Africa-China-Africa Vocational Education Cooperation Plan", but also provides a reference example and valuable sample for the construction of a more adaptive and forward-looking international Chinese language talent training system for hydropower projects.

After one year of practice, the cooperation between the two universities has laid a good foundation. In the future, it is necessary to further promote the systematization, standardization and modularization of talent training. We will further promote the upgrading of the mode of "teaching with output, school-enterprise peer" and build a community of shared future for schools and enterprises. While completing the training of basic talents, we should focus on the lifelong development of talents and the global influence of Chinese vocational education brands, and establish a global alumni network and career development support system.

Long-term development is inseparable from a stable mechanism. In the future, it is necessary to further strengthen the guarantee mechanism of multi-party linkage among government, industry, enterprise and school, and continuously optimize policy support, resource allocation, capital investment and quality evaluation to ensure the sustainability and high-quality development of the project, so as to contribute more 'Guangdong Wisdom' and 'Hydropower Model' to the construction of an all-weather China-Africa community of common destiny in the new era.

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