

# Research and Practice on the Reform of Talent Training Mode of ‘Excellence Program’ in Water Conservancy Project

Hu Huang, Jiwei Zhao, Lixia Guo\*, Xinyong Xu

School of Water Conservancy, North China University of Water Resources and Electric Power, Zhengzhou 450046, China

\*Correspondence Author

**Abstract:** *In view of the current structural imbalance between supply and demand of talents in water conservancy projects and the insufficient reserve of national strategic talents, measures such as innovating talent training mode, optimizing medium mechanism and training scheme, creating school-enterprise joint practice and formulating training quality assurance system are taken. After years of practice, the teaching and research ability of high-level talents teachers has achieved remarkable results, the curriculum construction and teaching effect have been significantly improved, the students’ innovative spirit and comprehensive ability have been significantly improved, and the professional construction has achieved remarkable results. The results can provide reference for the construction of similar water conservancy projects.*

**Keywords:** Local universities, Outstanding Engineer, Water conservancy project.

## 1. Introduction

Aiming at the major national strategies of ecological protection and high-quality development in the Yellow River Basin, the high-quality development of the follow-up project of the South-to-North Water Diversion Project, and the economic and social development needs of Henan Province [1-2], in order to solve the outstanding problems such as the structural imbalance between supply and demand of talents in the current water conservancy field, the lack of national strategic talent reserve, and the weak ability to serve regional development, we will thoroughly implement the strategic deployment of the integrated development of national education, science and technology and talents, respond to the requirements of the Ministry of Education for the cultivation of outstanding engineers and adapt to the educational needs of modern water conservancy technical talents, and implement the research and practice of the reform of the “Excellence Plan” talent training model. It has an important leading and exemplary role in the teaching reform of the same major in China [3].

## 2. Implementation Strategy and Path of Talent Training Mode Reform of ‘Excellence Program’ in Water Conservancy Project

### 2.1 Defining the Innovative Orientation of Talents and Practicing the ‘3 + 1’ Training Mode

Based on the advanced concept of engineering education reform, combined with the characteristics of water conservancy engineering specialty and the orientation of innovative talents training, relying on the talent training management system and structure of the school, this paper explores the training objectives of students’ theoretical knowledge, personal quality and development ability, team cooperation ability and engineering technology innovation ability in the enterprise and social environment. By strengthening the training and training of engineering practice ability, the new training mode of cultivating excellent

technical innovation talents and engineering technology management talents of water conservancy and hydropower engineering in the new century is practiced [4].

Through the selection of students and the establishment of “Excellent Engineer Plan Class” alone, the training standard of “Excellent Engineer Plan” for hydraulic engineering specialty was revised, the curriculum system of “knowledge + ability + quality” integrated training for excellent class was designed, and the “3 + 1” talent training mode with the main goal of improving technological innovation ability was practiced, that is, the professional basic education was carried out in the school in the first three years of university, and the basic scientific knowledge, core engineering basic knowledge and professional engineering basic knowledge were mainly studied to cultivate the comprehensive quality. In the last year, the practical internship was carried out in the enterprise, during which the students’ application of professional knowledge and the cultivation of engineering technology innovation ability were emphasized.

### 2.2 Optimize the Training Mechanism and Reform the Traditional Training Program

In order to realize the training goal of ‘training applied excellent engineers with certain innovation ability and broad vision’, who can meet the needs of socialist modernization, be competent for the planning, survey, design, construction, scientific and technological development and management of various water conservancy and hydropower projects, the traditional four-year whole-process on-campus learning training program was reformed, and an integrated training curriculum system of ‘knowledge + ability + quality’ was created. Innovative training objectives, curriculum system, syllabus, teaching methods and security system ‘five in one’, mutual convergence and promotion of innovative talent training mechanism.

### 2.3 Pay Attention to the Cultivation of Practical Ability, and Create a New Training Mode of School-enterprise Joint Practice

The training orientation of the “Excellence Program Class” of this major is the training of engineering technology innovation talents. In the training process, it pays attention to the cultivation and improvement of students’ practical innovation ability. The implementation process of the project is the undergraduate stage, and the school system is 4 years. Through revising the training program, adjusting the training plan, and building an off-campus platform for education, the ‘3 + 1’ training method is fully adopted. During the period of on-campus learning, a complementary professional learning mode of ‘double tutors’ inside and outside the school is established; in the one-year off-campus practice link, students are required to practice, practice, train and do graduation design in the whole process of enterprise practice. The process adopts the school-enterprise joint training mode of continuous supervision of on-campus tutors and whole-process ‘master-apprenticeship’ training of off-campus tutors, focusing on cultivating and exercising personal quality and development ability, application knowledge ability, collaboration ability and engineering technology innovation ability in enterprise and social environment.

#### 2.4 Ensure the Implementation Effect, Developed a Joint Training Quality Assurance System

In order to ensure the training goal of the “Excellence Program” of the water conservancy project, the school and enterprise jointly formulated the quality assurance system of the supervision, supervision and tutor guidance in the school, the regular inspection, result reporting and effect evaluation of the off-campus training link. The main contents include: management, evaluation, feedback and continuous improvement. The core is to evaluate and continuously improve the management mode of the school, the rationality of the professional training program, the teaching process of teachers and the learning effect of students by adopting an effective quality assurance system [5].

### 3. Practical Effect

Through the teaching reform and training mode innovation and practice of this model, we have achieved good results in students’ good response, high employment level, good evaluation of employers, and good practical results. The specific performance is as follows:

1) The excellent engineer class is equipped with on-campus innovation tutors and enterprise tutors. The innovative tutors equipped in this class are full-time teachers of hydraulic engineering. These tutors are the heads of national natural fund projects, provincial scientific research projects and production projects, and have rich scientific research and production experience. In addition, some business-savvy personnel with intermediate or above technical titles are hired from the industry as part-time teachers to build a team of ‘full-time and part-time’ teachers with rich teaching, scientific research and production experience. The teaching effect has been significantly improved.

2) There are many innovative projects participated by the excellent class students brought by the innovative tutors, including two excellent awards in the National College students’ Water Conservancy Innovation Design

Competition.

3) Combined with the excellent class training program and requirements, the organization of the school tutor to write a number of series of textbooks. In the teaching practice, constantly explore and summarize, in the domestic professional teaching reform journals published dozens of teaching reform papers.

4) Graduates of the excellent engineer class have been promoted to graduate students in well-known domestic water conservancy colleges, and the rest have been signed.

### 4. Conclusion

Under the background of large demand for water conservancy projects, the reform of talent training mode of ‘excellence plan’ for water conservancy projects is of great significance to improve teaching quality and promote the improvement of students’ professional ability. Relying on the optimization of training programs and the deepening of school-enterprise cooperation, it can effectively improve the utilization efficiency of educational resources, enhance students’ comprehensive ability and employment competitiveness, and lay a solid foundation for the society to cultivate more high-quality applied talents.

### Acknowledgments

This work was financially supported by The Key Project of Industry-Education Integration Research of Henan Provincial Department of Education (202318): Research on the Reform and Practice of Industry-Education Integration Cooperative Education Mechanism for Water Conservancy Specialty under the Background of New Engineering.

### References

- [1] Liu Yanwei, Cui Shiwei, Han Huanhao, et al. (2026). The construction of a new joint force system of “one core, double integration and multiple synergy” in local colleges and universities-Taking the agricultural water conservancy project of Kunming University of Science and Technology as an example. *Higher Education Journal*, vol.12, no. 04, p. 33-36 + 41.
- [2] Liu Zhongpei, Chang Chen Dynasty and Zhao Mengdie. (2026). Exploration and Practice of High-quality Development of Water Engineering Specialty - Taking North China University of Water Resources and Electric Power as an Example. *Henan Education (Higher Education)*, no.1, pp.9-10.
- [3] Cui Lijun. (2025). Research on talent supply and demand and integration of industry and education in water conservancy industry based on intelligent water conservancy. *Journal of Liaoning Open University (Social Science Edition)*, no.04, pp. 83-87.
- [4] Li Mengdi and He Huishuang. (2025). Innovative Research on the Training Mode of Academic Talents in Economics and Management Majors in Universities with Industry Characteristics - Taking North China University of Water Resources and Electric Power as an Example. *Henan Education (Higher Education)*, no. 12, pp. 31-32.

- [5] Xu Hao. (2025). Exploration on the training path of intelligent accounting talents based on school-enterprise cooperation-Taking Jiangxi University of Water Resources and Electric Power as an example. *Education Observation*, vol.14, no. 34, pp. 100-103.