

# The “Cradle of German Technical Talents” Re-Analysis of Dual System Mode

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**Abstract:** Dual system vocational education (DSVE) after the Second World War has been considered as the motive force and "secret weapons" of economic development in Germany. The education modes of DSVE are discussed from the aspects of educational connotation, educational system, fund guarantee, management framework, and teaching method.

## 1. Introduction

Dual system vocational education (DSVE), the cradle of technical talent incubation, has been considered as the cornerstone of economic development in Germany, even known as the European model, attracting worldwide attention. The essence of DSVE is the enterprise educational resource development system guided by institutionalized policies. However, owing to the incoordination between the economic system and educational system led by administrative management, the school-enterprise cooperation in Chinese vocational education is struggling, resulting in the sluggish vocational education reform [1]. In order to explore the vocational education model suitable for China's national conditions, it is basically necessary to elucidate the connotation and essence of DSVE in Germany before developing the methodology of cultivating technical talents with Chinese characteristics. This paper reviews the DSVE in Germany to provide reference for the reform of Chinese vocational education model.

## 2. The education system in Germany

Germany, the world's largest equipment manufacturer, is an industrial country lacking in raw materials. Its booming economy relies on technological strength. The DSVE, the "bridge" of manufacturing industry, is regarded as the "secret weapon" to create the German economic miracle after the Second World War. The DSVE in Germany is a channel for innovation-driven collaboration between enterprises, universities and research institutes. The DSVE education model is a concept and curriculum model oriented by employment. The so-called "dual system" refers to enterprises and schools, respectively, that is, the subject of vocational education implementation is composed of profit-oriented enterprises and public-welfare vocational schools [2].

The structure of the German education system is shown in Fig.1. After graduating from primary school, German students can choose their future career direction. If they prefer a career dominated by technical practice in the future, they can enter the main middle school where students mainly come from ordinary workers and peasant families. If you choose a career that requires high theoretical depth in the future, you can enter a complete middle school (or a liberal arts and science

middle school) where students mainly come from doctors, lawyers and other upper-class families. Students in between go to real science secondary schools, mainly from middle-class families. After the first direction selection, the ratio of the three types of students is roughly 3:1:2. After graduating from middle school, students choose their second career direction. Students from liberal arts and science secondary schools usually study in ordinary senior high schools and go directly to comprehensive universities after graduation. After graduating from main body middle school and real subject middle school, students usually enter vocational high schools including employment-oriented schools with DSVE, full-time vocational schools and vocational schools with "overpass" function. After the second direction selection, the ratio of ordinary high school students to vocational high school students is approximately 3:7. After graduating from high school, students choose their third career direction. In Germany, about 70% of graduates take part in the DSVE training every year, while only 30% go to university.

There are three types of universities in Germany: comprehensive university, university of applied technology and "dual system" university [3]. Ordinary high school graduates can be directly promoted to the comprehensive university of five years, and directly awarded the master's degree after graduation. Vocational high school graduates who want to study in a comprehensive university must master a second foreign language or take a year of preparatory theory courses, but vocational high school graduates who study in a comprehensive university do not account for a high proportion. Before enrolling in the dual system and the University of Applied Technology, students need to sign a training agreement with a company, and they must choose majors from 330 nationally recognized vocational education programs issued by the federal government. After the training, students will receive two certificate of completion, IHK certificate and engineer degree certificate.

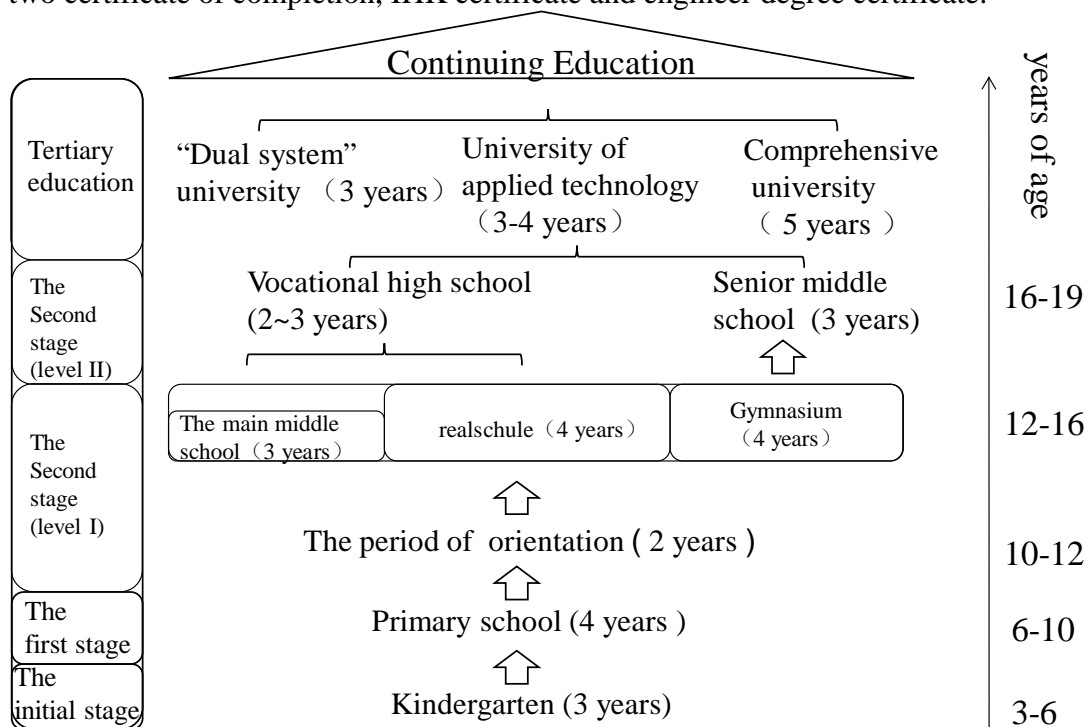


Figure 1. Structure chart of German education system

### 3. Funds guarantee of DSVE

In DSVE, vocational schools and training enterprises jointly complete the training commission [4]. Due to the curriculum system close to production practice, the combination between theory studying and practice training deepens the effects of operation process. Besides, systematic training can ensure the ability cultivation. Learning a new skill based on a student's major is beneficial to avoid unemployment. Enterprises that sign training contracts with students must have the qualifications

reviewed and identified by the trade association under the federal vocational education act. The enterprise provides teaching space, and introduces integrated professional classrooms, simulation companies and other facilities in the process of technology teaching. Enterprises can be qualified for training through the review of the industry association in the aspects of the hardware teaching facilities, the number of certified trainers, training plans and content, and other aspects. Giant German companies generally have their own training center and training personnel. While small and medium-sized enterprises do not have specialized training conditions. Thus, co-funding cross-enterprise training centers are established by enterprise and industry associations led by government. Cross-enterprise training centers aim at training students' skill, imitation production real scene layout, reflect teaching to do together. The cross-enterprise training centers are affiliated to the industry association and independently operated. Schools and enterprises share teaching materials, teachers, equipment, training venues and other resources in a rational way, taking the work-oriented approach as the train of thought, taking "teaching people to fish" as the concept, and shaping talents according to the demand of the labor market.

About 1/3 of the funds investment for DSVE shall be borne by the government and 2/3 by the enterprises. The guarantee system of training funds is shown in Fig.2. According to the German federal vocational education law, enterprises need to sign a public law vocational education contract with students who choose the DSVE. After the contract is signed, students have 1-2 days a week to study in vocational schools and 3-4 days to study in enterprises. In the whole training process, students receive subsistence allowance from the enterprises. The enterprise shall bear the expenses incurred in the process of students' practice, including the cost of skill training and construction of practice workshop. Teachers in vocational schools are civil servants, and education costs are borne by the federal and state governments.

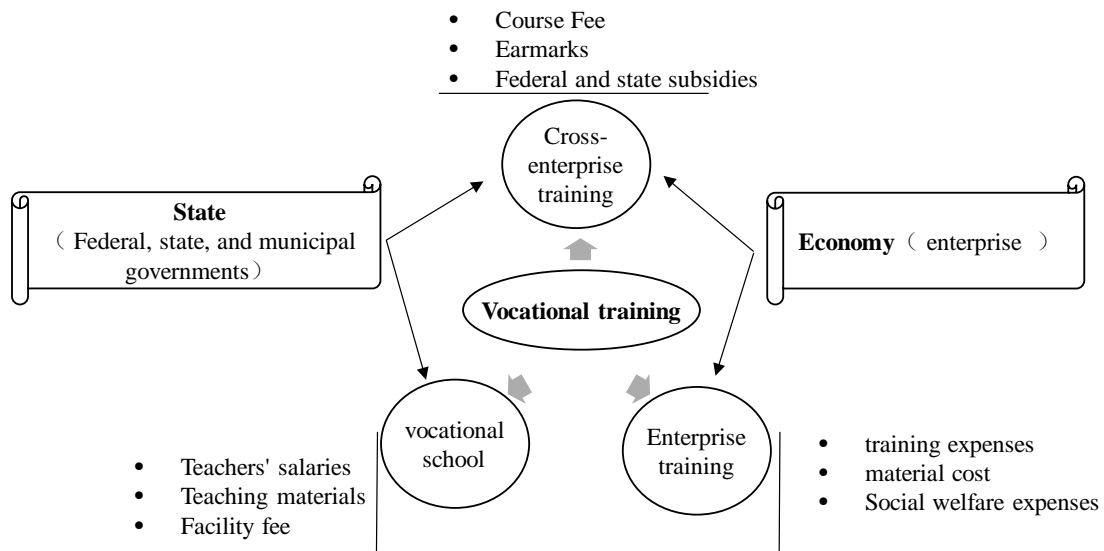


Figure 2. The funds guarantee system of Dual education and training

#### 4. Management framework of dual education system

The management framework of DSVE is divided into federal government level, state level and regional level (Fig.3) [5]. The federal government is responsible for the overall arrangement of vocational education with the main functions of evaluating and describing the occupation, exploring the emerging occupation field, promulgating the professional catalogue of vocational education, "vocational training regulations" and other documents and be responsible for the implementation. As the basis of vocational training, "vocational training regulation" is the guiding document for leading enterprise training mode. At the state level, the role of the joint conference of state ministers of education and culture is to formulate the vocational education framework teaching plan for vocational schools on the basis of the vocational education regulations enacted by the federal

government. "Vocational education framework teaching plan" is the guiding document for leading vocational school training mode. The setting of teaching objectives of vocational schools should be based on the "vocational education framework teaching plan" issued by the department of culture and education of the state and the state teaching plan, so as to carry out the teaching of basic theoretical knowledge and professional theoretical knowledge.

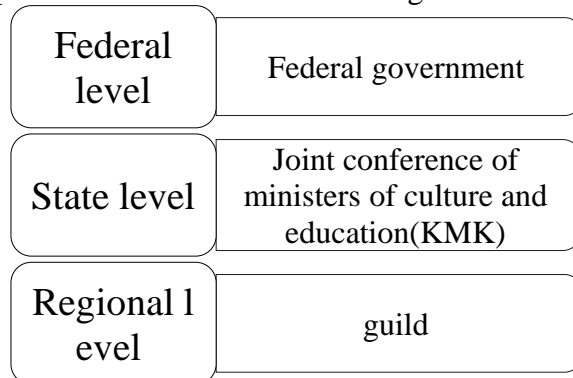


Figure 3. The management framework of DSVE

Trade associations play an important role in DSVE. At the state level, there are two main trade associations in Germany: one is IHK, which is closely connected with the business community, and the other is HWK. The association is divided into central and municipal levels.

In Germany, trade associations have three important responsibilities. The first one is to provide career advice. The second one is responsible for certification of the qualifications of training institutions. In the whole training process, the training mode of enterprises is supervised by the industry association. The third one is responsible for the vocational skill appraisal examination. The association supervises and certifies the tests at the annual national vocational skills testing center, among which the qualification of the examiner determined by a committee established within the association, the corresponding occupational qualification certificate issued by the vocational skills appraisal center.

### 5. Behavior oriented teaching method in DSVE

The course content of DSVE is arranged in various ways, including flexible teaching modes, experimentally operational methods, demonstration, discussion, role playing and "Learning Island". The implementation of DSVE takes "employment orientation" as the core concept. The specialty setting according to the current market demand. The curriculum content aim at simulating actual work scenario. Correspondingly, the course setting is oriented by career with extensive, fine and in-depth content, cultivating students' initiative. The examination and assessment is based on professional qualifications.

Project teaching method is the main practice mode of teaching method [6]. One of the charms of the project teaching method in Germany vocational education is that it is task-oriented, allowing students to design and conceive independently until the task is completed. In this process, teachers only provide suggestions.

The teaching method is set up according to the quality of occupational workers required. Teaching methods should also be combined with the environment of our era, information, technical characteristics. Students themselves look up information, organize learning activities. After completion the assignment, the evaluation is carried out by student themselves, and then submitted to the teachers. The behavior oriented teaching method system is shown in Fig.4.

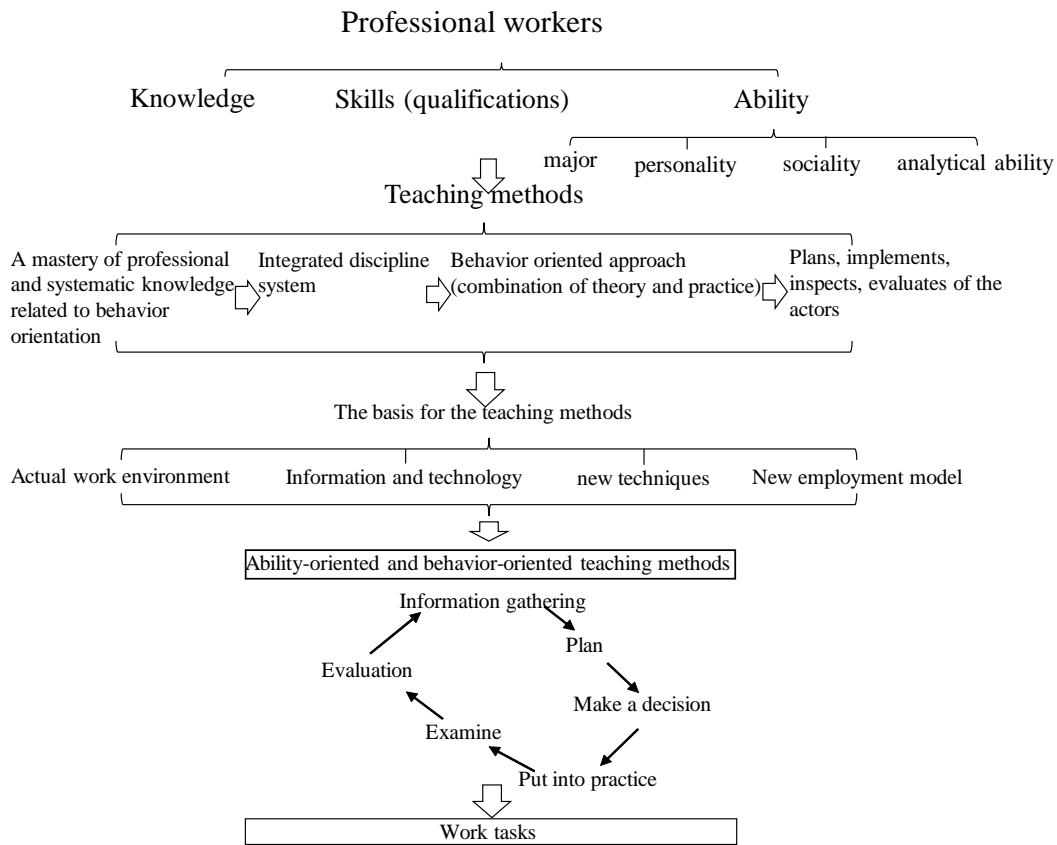


Figure 4. The behavior oriented teaching method

## 6. Conclusion

In order to improve the status of international industrial division of labor, China urgently needs to implement industrial upgrading. The demand for technical talents is ever-increasing, and vocational schools, which serve as a bridge for transferring technical talents, urgently need to reform the old system. In the era of professionalism, there is still a long way to go to develop a vocational education system that can adapt to the trend of times and meet the market demand seamlessly. And the grasp of the essential characteristics of DSVE in Germany can provide a basis for our country to learn from the experience of German vocational education.

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