A Comparative Study of Sino-German Higher Vocational Education Based on the CIPP Model

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Abstract. As China enters a new stage of development, industrial upgrading and economic restructuring are accelerating, the demand for technically skilled personnel in various industries is becoming more and more urgent, and the important status and role of vocational education is becoming more and more prominent. However, compared with developed countries and the requirements of building a modernized economic system and a strong education country, there are still areas where the system construction of vocational education in China is not perfect. Based on the CIPP model, this paper compares the higher vocational education in China and Germany, in order to provide a reference for the reform and innovation of higher vocational education in China.

Keywords: Sino-German higher vocational education · CIPP model · Comparative study

1 Introduction

In 2019, the State introduced the National Implementation Plan for Vocational Education Reform, stating that we should adhere to the guidance of Xi Jinping's thought of socialism with Chinese characteristics in the new era and place vocational education in a more prominent position in education reform and innovation and economic and social development [1]. As Germany with highly developed vocational education, its higher vocational education is of great significance for us to learn from. Combining Germany's advanced education and teaching experience to promote the reform and innovation of higher vocational education in China is of practical significance.

CIPP model was proposed by American scholar Stufflebeam D. L. in 1967, which consists of four parts: Context, Input, Process, and Product evaluation [2]. This paper compares the higher vocational education in China and Germany with this model, so as to make some references to the reform and innovation of higher vocational education in China.

Y. Chen et al. (Eds.): ICMETSS 2022, ASSEHR 693, pp. 691–697, 2023.
https://doi.org/10.2991/978-2-494069-45-9_84

2 Comparative Analysis of Sino-German Higher Vocational Education

2.1 Comparison of the Teaching Objectives of Sino-German Higher Vocational Education

The cultivation objectives of higher vocational education (mainly technical education) in China and Germany are basically the same, i.e. to cultivate skilled technical workers with proficient operation skills in the first line of production in enterprises, requiring graduates to have strong vocational awareness, good professional ethics, skillful vocational skills and necessary vocational theories [3]. However, the difference is that German dual vocational education focuses on the cultivation of students' comprehensive vocational competence on the one hand, and places special emphasis on the training of competencies that go beyond vocational skills and vocational knowledge on the other hand [4]. This shows that German higher vocational education emphasizes student-centeredness, attention to the learning experience and individual creation of students in the learning process.

2.2 Comparison of Teaching Elements of Sino-German Higher Vocational Education

The comparison of these three aspects also reflects the characteristics of their different education mechanisms.

Analysis of Student Source Elements. In February 2019, the State Council issued the *Implementation Plan for National Vocational Education Reform*, which pointed out that the system of "Vocational Education College Entrance Examination" should provide students with various ways to enter higher vocational education [5]. The current enrollment path of VET higher education in China is diverse, not only in the time of enrollment but also in the way of enrollment, from the unified college entrance examination to the situation that each school has its own enrollment and college entrance examination coexisting. In addition, the student source structure is also diversified, and the enrollment targets face not only students but also the society [5], as is shown in the Table 1.

The German universities of applied sciences and vocational colleges opened to graduates of secondary schools with university entrance qualifications set different conditions depending on the field of study. For graduates of full secondary schools, the universities of applied sciences require students to have an internship experience before enrolling in the university in order to lay the foundation for later theoretical studies. In addition, students must sign a contract with a company to become an employee of the company before enrolling in the vocational school, which reflects the characteristics of school-enterprise cooperation in German higher vocational education.

Faculty Analysis. China's higher vocational education has been expanding rapidly in recent years, and the growth of the number of teachers in institutions has been far from keeping up with the growth of student scale, resulting in the phenomenon of a high teacher-student ratio. Currently, the median student-faculty ratio in China's higher

Table 1. "Seven types and twelve ways" of vocational education entrance examinations in China [5]

Category	Acceptance Method	Admission Batch and Volunteer	Student Source
Unified College Entrance Examination	Unified Admissions	The third batch (specialist batch)	General High School Graduates
Spring College Entrance Examination	Special Admissions	Spring Entrance Examination Batch	General High School Graduates
Separate recruitment	Bachelor of Applied Technology Level Admissions	Parallel Volunteers	Secondary school graduates
	Senior high school level Admissions	Parallel Volunteers	Secondary school graduates
Self-directed Admissions	Self-designed school exams Admissions	Independent admission to higher education institutions, no college entrance examination	General High School Graduates Secondary school graduates
	Early admission to higher education	Academic examination + vocational skills test + comprehensive evaluation, no need for college entrance examination	
	"Trinity" Comprehensive Assessment Admission	Academic Examination + Comprehensive Quality Assessment + College Entrance Examination	
High and Middle School Articulation	3 + 2 or 2 + 3	The students will be trained in secondary and higher education, and will be admitted to higher education institutions directly after the examination.	Junior high school graduates

(*continued*)

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Category	Acceptance Method	Admission Batch and Volunteer	Student Source
	Five-year Consistent System	Integrated enrollment and training of middle and high school	
Enrollment	Application for registration system	Candidate Application + Institution Review + Candidate Confirmation	General High School Graduates
Exemption from examination	Application for Admission	Candidates applying for exemption	Community

vocational institutions is 17.9 [6]. In addition, most institutions do not have a long-term plan for teacher training, and their training systems mainly stipulate that young teachers must obtain a master's degree without considering individual teachers' characteristics in conjunction with the long-term planning of colleges [7]. Therefore, China has a long way to go on the road to faculty development.

The whole process of higher vocational education in Germany is organized and implemented by full-time teachers of universities and engineering technicians and managers of enterprises. In addition to academic requirements, teachers of theoretical courses in German vocational schools must have at least two years of practical work experience in their specialties, be tested by two national examinations, and have a one-year probationary period during their teaching in schools. The number of full-time teachers is low, and teaching, especially in specialized and practical courses, is mainly carried out by part-time teachers [8]. Besides having solid theoretical knowledge and practical experience, these part-time teachers are able to teach students the inner workings of companies as well as social situations. In addition, Germany has a flexible and fruitful system of further education for teachers, which is the origin of Germany's highly capable and qualified vocational teaching force.

Analysis of Teaching Conditions. China's higher education institutions have a single source of funding for equipment, mainly relying on financial support at the central and local levels, with less self-financing by schools. And from the perspective of higher education in the country, the decision-making and education investment of governments at all levels tend to be biased toward general education and do not give enough attention to vocational education [9]. In contrast, German students' practical training and internship are mainly done in enterprises, and students have access to the instruments and equipment being used and to be used by enterprises. In addition, German schools also have advanced teaching equipments invested by enterprises that reach a level comparable to that of enterprises.

2.3 Comparison of Chinese and German Higher Vocational Education Curricula

The curriculum is the core element of talent cultivation. Under different education systems, there are significant differences in the allocation of credit hours, teaching content and examination forms between Chinese and German higher vocational institutions.

In terms of the allocation of school hours, the German curriculum has very few public courses, which generally do not account for more than 1/5 of the school hours. This is because Germany believes that students have received a complete basic education, and the curriculum should focus on cultivating students' professional abilities. The curriculum of many higher vocational colleges in China is still the traditional "three-stage" of public courses, basic courses, and professional courses. The teaching hours of public courses account for about 1/3 of the total number of hours. The teaching content is out of touch with the knowledge and skills required for the job and is out of line with society.

In terms of teaching content, Germany adopts a selective approach to teaching. They will decide whether to offer the course according to whether the course will help students in their practical work, and whether the curriculum is closely integrated with the student's career development. This kind of content selection is an important guarantee for German students to obtain good practical and hands-on skills. In contrast, the teaching contents of domestic higher vocational institutions generally focus on the elaboration of theoretical knowledge, and the proportion of contents in practical application is too small. Some majors offer courses that are completely beyond the learning ability of students in vocational institutions, such as "Advanced mathematics" and other highly difficult courses [10].

In the form of examinations, the organization of examinations and the assessment of academic results and skills are jointly conducted by enterprises and schools in Germany: schools are responsible for the examination of students' theoretical knowledge, while enterprises evaluaenterprisete students' internship and practical training. In contrast, Chinese higher education institutions have a single assessment method. The usual course grades are evaluated according to a certain percentage of the usual grades and the final grades. Besides, students only need to submit a graduation thesis to pass.

2.4 Comparison of Teaching Achievements Between Chinese and German Higher Vocational Institutions

McKeith has conducted a statistical survey on the distribution of graduation destinations for the 2017–2021 class, as shown in Table 2.

McKeith has conducted a statistical survey on the distribution of graduation destinations for the 2017–2021 class, which shows that the proportion of those who study for a bachelor's degree increases further, from 5.4% in 2017 to 19.3% in 2021; the proportion of those who are employed to work (82.8% in 2017 and 64.4% in 2021) decreases accordingly, but still accounts for the majority. The data shows that the implementation rate of graduation destination of the 2021 senior vocational students is 90.6% six months after graduation and the stable implementation rate of graduation destination [11]. In contrast, in Germany, under the background of a dual education system, students enter school as employees of enterprises and generally stay in enterprises after graduation, so the enterprise talent turnover rate is small.

Table 2. Changes in the distribution of graduates' destinations six months after graduation from the 2017–2021 higher education institutions [11]

Unit: %, percentage points						
Distribution of graduates from higher vocational institutions	Class of 2021	Class of 2020	Class of 2019	Class of 2018	Class of 2017	Five years of change
Work for hire	64.4	68.4	80.3	82.0	82.8	−18.4
Freelance	2.8	3.6	–	–	–	–
Self-employment	3.1	2.8	3.4	3.6	3.8	−0.7
Enlisted	1.0	0.8	0.6	0.6	0.5	0.5
Undergraduate study	19.3	15.3	7.6	6.3	5.4	13.9
Unemployed	9.4	9.1	8.1	7.5	7.5	1.9

Note 1: "Freelance" is a new option for the class of 2020
Note 2: Five-year percentage change refers to the percentage of the class of 2021 minus the percentage of the class of 2017
Note 3: Unemployed includes preparing for higher education and pending employment

3 Conclusion

In conclusion, China's higher vocational education is still in the formative stage. We should give full play to the advantages of the industry, promote school-enterprise cooperation, and focus on the improvement of students' practical innovation ability. In addition, we should strengthen international exchanges, and enrich the scientific theory and practical achievements of higher vocational education, to better meet the challenges raised by China's industrial upgrading and economic restructuring.

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