The Practical Path of Double-High Construction in Private Higher Vocational Colleges from the Perspective of Industry-Education Integration

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Abstract: *The double-high construction of private higher vocational colleges differs from that of public institutions in terms of the structure of property rights and sources of funds, and its content gives more weight to the autonomous integration of educational resources and market-oriented regulatory capacity. Industry-education integration is one of the main ways to bring in external industrial resources and strengthen the educational components, such as teachers, curriculum and training facilities, to improve the response ability of professional clusters; however, there is also a conflict between the short-term demands of enterprises and the long-term needs of education. However, there are all kinds of structural constraints on the "double-high construction" of private higher vocational colleges, such as differences in the ability to obtain resources due to property rights arrangements, the asymmetric dependency dilemma in school-enterprise cooperation, and a lag in the internal governance response to industry-education collaboration. Therefore, based on the above reasons, the three driving paths put forward are the dynamic mapping of professional clusters and industrial chains, modular curriculum restructuring according to job competency, and a closed-loop promotion mechanism for the capability iteration of dual-qualified teachers. Given the organisational structure of private higher vocational colleges, which has a short decision-making path and wide management autonomy, the three ways mentioned above can provide good technical support for the Double-High Construction in terms of industry-education integration.*

Keywords: *Private high vocational colleges, Double-High Construction, Industry-education integration, Structural constraints, Pathway design*

Introduction

Private higher vocational colleges account for a relatively large proportion of the total number of higher vocational institutions in China, and their construction and operation are carried out under different resource conditions and regulations than those of public institutions. As they do not have a regular source of funds from the government, private higher vocational colleges must live on tuition fees, income from social services and small donations. Therefore, the progress of strengthening the high-level professional cluster and high-level educational capabilities will be limited by the strength of internal governance and the degree of external industrial resource integration. Industry-education integration should be regarded as a typical case of cooperation between schools and enterprises, but its implementation in the private sector has not gone smoothly. Lack of property rights reduces the motivation of the company to invest in the long run; asymmetric dependence changes the terms of cooperation to favour the demands of the company, and further, information filtering and a mismatch between authority and responsibility in the organisation reduce the responsiveness of the industry-education collaboration. Most of the previous research on Double-High Construction or industry-education integration has focused on public institutions, and relatively few studies have examined the actual situation of private higher vocational colleges under the dual-constraint system. Therefore, we need to clarify the logical link between industry-education integration and the "double-high" construction of private higher vocational colleges, identify the structural constraints on this link, and develop practical implementation plans based on the analysis above. The purposes of this paper are to advance the development of theories for private higher vocational colleges and to improve the actual results of industry-education integration.

1. Logical Linkage of Industry-Education Integration and Double-High Construction in Private Higher Vocational Colleges

1.1 Definition of the Connotation of Double-High Construction in Private Higher Vocational Colleges

The concept of "double-high construction" for private higher vocational colleges is not the standard development model of public institutions, and they do not receive funding from the government budget. Given the structure of property rights and other sources of resource procurement, private higher vocational colleges aim to build high-end professional clusters and achieve good educational results; thus, they are paying more attention to the autonomous integration of educational resources and market-oriented regulatory power, but they also need to consider the self-equilibrium of input-output benefits. The first goal of the Double-High Construction is to strengthen the internal management and ensure the financial health of the professional cluster for all-round development. The above items fall under the specific logic for improving the quality of the private sector's talent pool, faculty position structure, facility input-output efficiency, etc., and resource turnover efficiency should also be achieved for the construction to be effective.

Double-High Construction of private higher vocational colleges is also an enterprise that needs to build organisational resilience. Given the unstable fiscal foundation, high-level development of these institutions will often depend on reinvesting tuition fees and other service income; thus, the Double-High goals should be in line with market demand, such as attracting more students and improving the employment competitiveness of graduates. That is to say, a high-level professional cluster is one that can quickly revise the curriculum content in response to changes in the job market and does not need to accumulate assessment data. Therefore, the definition of the connotation of Double-High Construction in private higher vocational colleges should be based on the joint improvement of resource utilisation efficiency and teaching output under property rights constraints, and not merely be an application of the static evaluation framework for public institutions. The knowledge of connotation is also the starting point for the following identification of structural constraints[1].

1.2 The Embedding Mechanism of Industry-Education Integration in Educational Elements

To bring in external industrial resources for the education system, industry-education integration has been organised at the level of faculties, curricula and training institutions in private higher vocational colleges. At the level of the faculty, the embedding mechanism will be to have enterprises with strong technical foundations participate in teaching through part-time lectures and project guidance; this will replace the functional allocation of some theory-oriented teachers and change the composition ratio of faculty capabilities. Embeddings of curriculum elements can be seen in the disaggregation of task modules according to work processes and their direct inclusion in the syllabus; thus, the traditional discipline-based organisation of knowledge has been replaced to improve the transparency of the correspondence between learning content and production processes. Generally speaking, in terms of the combination of industry and education for equipment, the form is equipment donation or joint construction of laboratories to introduce enterprise-level technical standards in schools for practical training; thus, the original speed of asset depreciation and replacement is reduced, and the waiting time for students to use cutting-edge equipment is shortened.

Integration will occur at a deeper level in the middle and later stages of education; that is to say, the ability assessment for students should meet the demands of employers. Construct a job skill index and, accordingly, private higher vocational colleges will adjust the distribution and assessment of credit. For example, the participation of enterprises in the scoring of graduation projects or in the documentation of on-the-job training is an external source of this kind of information. It is not an administrative order but rather the result of resource sharing and benefit sharing. Due to the flexibility of property rights, private higher vocational colleges can generally carry out this embedding more quickly; however, they are also in a difficult situation and need to meet both the short-term demands of enterprises and the long-term requirements of educational regulations.

1.3 Adaptation of Double-High Goals to the Needs of Industry-Education Integration

The construction of high-level professional clusters in the Double-High Goals should align the direction of professional development with that of industrial chains. At the same time, the demand for

industrial-educational integration is that enterprises can easily obtain local talents and technical service support, and there is also a time lag in both. The first type of adjustment is to make the Design of the professional cluster more flexible; private higher vocational colleges need to add various micro-majors or modular curriculum packages according to the changing demands of enterprises for talent at different times while keeping the core professional content. Therefore, the long-term achievement of the Double-High goals will not be hindered by short-term demands for cooperation, and the problem of skills mismatch at the enterprise will also be solved[2].

We can also see how far the investment coordination has been extended in all sectors. Although the first goal of the double-high plan is to promote the training of hardware and faculty, there is now a high demand in the industry for students' speed in adapting to work and participating in projects. Build a competence map, change the two kinds of goals into measurable learning objectives, and then find the intersection. For example, the company needs to reduce the time it takes for new employees to become proficient in their work, and this is in line with the "Double-High" goal of improving the quality of talent cultivation in the teaching sector for "job task decomposition training". Private higher vocational colleges have the advantage of a shorter decision-making chain and can adjust the proportion of practical training hours in their curriculum promptly; thus, the Double-High goals will no longer be external demands but will be integrated into the procedural links of daily teaching.

2. Structural Constraints on the Double-High Construction in Private Higher Vocational Colleges

2.1 Differences in Resource Acquisition Ability Under Property Rights Regimes

Generally speaking, the structure of property rights for private higher vocational colleges is that of individual or corporate capital, and thus the ownership of assets and the distribution of profits directly affect the narrowness of resource acquisition channels. Private higher vocational colleges cannot regularly obtain funds from the government budget for equipment renovation and staff training as public institutions can; their main sources of income are tuition and fees, income from social service activities and limited social donations. Due to this property-rights arrangement, many enterprises have used extended depreciation for investments in teaching facilities; as a result, the renewal cycle of training equipment is much longer than the speed of change in industrial technology, and thus it cannot meet the equipment configuration requirements for high-level professional clusters of advanced technological facilities in the Double-High Construction. Different resources are obtained for different reasons, so the high market-level salaries of industry backbone personnel need to be covered by the surplus of educational operations; as a result, there is a relatively high proportion of theory-oriented teachers at the faculty level and a restriction on introducing dual-qualified personnel with production-line experience.

For the operation of assets, the termination of property rights in private higher vocational colleges will also reduce external sources of funds. As there is no official channel for the transfer of property rights, enterprises cannot be sure that they will retain the rights and interests in the assets and investments made with equipment and funds, so they are unwilling to invest in industry-education integration for the long term. At the same time, private higher vocational colleges generally have a higher credit assessment threshold for special construction loans and social finance because they are non-profit institutions and do not have property-rights mortgages. At all times in the procurement of resources, the speed of project progress has been slow; that is to say, the achievement rate of hardware-related indicators is generally lower than that of software-related indicators, and the low density of equipment sharing among professional clusters directly affects the scope of authenticity restoration in job skill training.

2.2 The Asymmetric Dependency Dilemma in School-Enterprise Cooperation

Cooperation between private higher vocational colleges and enterprises is usually rare and unevenly distributed. Enterprises are responsible for production orders, technical standards and job recruitment; private higher vocational colleges are mainly responsible for interns and basic labour. Due to the imbalance of dependence, the cooperation terms will be closer to what the enterprises desire. In the joint formulation of talent cultivation plans, many enterprises have reduced the number of general theoretical classes and increased hands-on operational training in line with the goals of "Double-High Construction" and long-term development ability. In order to obtain training equipment and part-time teacher resources, some private higher vocational colleges have had to agree to the exclusive

cooperation terms proposed by enterprises, limit students' access to recruitment information from other similar enterprises, and thus reduce their choices in career paths[3].

Asymmetric dependence is a kind of risk that does not spread the risk of cooperative failure evenly. If there are fluctuations in the industry or changes to the company's strategy, we can terminate the cooperation agreement at any time with little loss; however, the private high vocational college has already incurred sunk costs by adjusting curriculum modules and setting up special training venues according to the company's needs. The problem is more severe at the level of private higher vocational colleges because the number of students and operating conditions are directly related to the job creation capacity of a few key partner enterprises. To avoid passivity, some institutions have started to work with several enterprises at the same time to obtain various resources; however, due to the heavy workload of the faculty and the cycle of teaching schedules, the coordination costs of parallel embedding with multiple enterprises are rising rapidly. Asymmetric dependence is, in fact, the result of uneven bargaining power for resources, and it reduces the autonomous planning space of Double-High Construction at the level of professional clusters.

2.3 The Response Lag of Internal Governance to Industry-Education Collaboration

Generally speaking, the internal governance structure of private higher vocational colleges is the president-responsibility system under the leadership of the board of directors. Although the decision-making path is shorter than that of public institutions, there is still an information filter between the professional teaching line and the administrative management line. The application for adjustment of courses at the department level needs to be individually approved by all relevant departments, such as academic affairs, asset management and human resources; however, the demand from enterprises in industry-education integration for changes in job skills often needs to be met within a single teaching cycle. At this time, the update speed of the course content is slower than the iteration speed of industry skills, and there is a mismatch between the task modules in practical training projects and the actual operations of enterprises. The second is that the old faculty appraisal system. At present, the evaluation criteria for professional titles are mainly the number of teaching hours and published papers; teachers' participation in industry-education collaboration activities, such as enterprise research and curriculum reform, is given relatively little weight, and thus the incentive to participate at the grassroots level is low.

Another serious problem is the distribution of power and responsibility among the leaders of the professional clusters. Although the private higher vocational college has theoretical autonomy in personnel management, it generally does not have sufficient funds for professional cluster leaders; therefore, the formation of cross-disciplinary course teams and the purchase of special equipment still need to be approved by senior management. With the change in the structure of professional clusters, the curriculum and content of practical training need to be updated in a timely manner according to changes in industry-education collaboration; enterprise mentors should be introduced, and so on, but there is currently no regular approval channel for such flexible modifications. If the company has an urgent training need or a proposal for a joint-development project, and it takes too long to get approval, the company will not be able to act in time and will miss out on the cooperation opportunity. The response lag of internal governance is at the level of agreement on industry-education integration, and it cannot be used for procedural operation of daily teaching.

3. Pathway Design for Driving Double-High Construction Through Industry-Education Cooperation

3.1 Dynamic Mapping Method for Professional Clusters and Industrial Chains

The construction of professional clusters should be based on a flexible map rather than a fixed list of professional combinations, and should align with the distribution of job clusters in industrial chains. The job task flow analysis tool can be used to divide the three types of activity units in the target industrial chain into core processes, auxiliary processes and extended services, and then these units can be mapped to the shared basic courses, directional module courses and extended elective courses in the professional clusters of private higher vocational colleges. The first rule of the mapping method is to establish a set of two-way adjustment rules: When there are changes in the process or new job types in the industrial chain, enterprise feedback forms and graduate tracking data will be used to revise the course content of relevant majors, and the extent of revision will be limited to 15% per module to

ensure the stability of professional clusters. Do not reverse the original cultivation plan; only some changes will be made in the preset interface module[4].

Organise the data well and be aware of the passage of time. Private higher vocational colleges can build a reference database of professional clusters and industrial chains to store job skill description documents, equipment operation specification texts and time-sequence breakdown diagrams of typical work tasks. At the beginning of each semester, the programme leader will work with the company's personnel and teaching staff to compare the content in the database with the current teaching syllabus and create a list of differences. The serious problems in the list will be added to the practical training projects for the next teaching period immediately, and the minor ones will be organised as optional courses or extracurricular activities. The mapping method does not cover all the links in the chain; instead, it focuses on the three or five job clusters with the highest employment concentration in the industrial chain, builds the main structure of professional clusters around these, and flexibly adds the other links in modules.

3.2 Modular Curriculum Reorganisation Based on Job Competencies

The first step of the Modular Curriculum Restructuring is to build a Job Competency Inventory and move away from the old model of knowledge-based chapters. First, break down the general work tasks of the target position into several independently teachable competency units, and each unit should have three to five specific operational indicators or judgment criteria. Based on the above indices, the private higher vocational colleges can obtain the corresponding content snippets from the existing courses and organise them into learning modules of four to eight hours. The input-output connections of the modules are clear, and the assessment results of the previous module need to be used as the input for the next module. The reformed curriculum will be a set of modules that can be chosen and combined in various ways according to the different career goals of students in the same major, rather than being taught all at once.

The actual constraint of modular restructuring is the division of faculty assignment and classroom scheduling. Therefore, the first two weeks will be used to learn the theory of the foundation module in depth, and the following two weeks will be for practical training modules; these two weeks will be coordinated with each other. All modules have assessment packages, and there are both an operation checklist and a scoring rubric; only after passing the module's assessment will credits be granted. Information on changes in job skills released by enterprises can be added directly to a specific module and does not need to be updated in the entire curriculum system. Private higher vocational colleges have some autonomy in academic administration and can thus arrange modular timetables more flexibly; however, the number of modules should be limited to eight to twelve so as not to lose control over instructional organisation costs due to excessive division[5].

3.3 Closed-Loop Promotion Mechanism for the Capability Iteration of Dual-Qualified Teachers

The iteration ability of the dual-qualified teacher team should be a closed-loop process that can be repeated several times, not just a single training event. The start of the closed-loop process is the job skill tracking report at the end of each semester, which is provided by partner enterprises and contains a list of technical changes and requirements for operating new equipment in the next quarter. Based on the above report, private higher vocational colleges can compare their current strengths with those of dual-qualified teachers to find any deficiencies in skills. Given the above shortcomings, short-cycle special training tasks have been introduced, and now teachers can enter enterprise production lines to participate in a certain amount of on-the-job training and observation, or enterprise technical support teams can be invited to the school for equipment operation and disassembly demonstrations. According to the training, both simulated teaching and actual teaching will be conducted to determine how much better the teachers have become. The results of the assessment will be added to the teacher's ability profile and used as the basis for the next round of skill tracking[6].

The continuous operation of the closed-loop mechanism is based on how capability iteration is connected with teacher performance. Private higher vocational colleges can increase the class-hour coefficient bonus per completed iteration to address the problem of skill shortages in the conversion coefficient for semester workload. At the same time, a dynamic adjustment window will be set for the capability rating of dual-qualified teachers, and the application period for this rating will be opened once a year; after submitting proof of mastery of skills or operation certificates issued by enterprises, teachers can have their ratings increased. To ensure the good operation of the closed-loop mechanism,

an early warning rule for capability withdrawal will be introduced: teachers with the same skill gap who have not had their problems resolved after two rounds of skill tracking will be placed in remedial training. A closed-loop design will be introduced to revise the construction of the dual-qualified teacher team; it will move away from the fixed standard-achievement model and adopt a regular update cycle to respond to changes in technology and meet the demand for continuous adaptation of the teaching workforce in light of industry-education integration.

Conclusion

According to the logic of property rights constraints and the integration of industry and education, this paper has identified the features of double-high construction in private higher vocational colleges and found that there are three types of structural constraints: differences in the ability to obtain resources, an asymmetric dependency dilemma, and a response lag in internal governance. Based on the above, the following three practical paths have been established: First, a dynamic mapping method for professional clusters and industrial chains will be introduced, and the elasticity of professional clusters will be guaranteed by means of job-task flow analysis and the use of reference databases. Second, in light of the curriculum reform to meet the demands of the job market, the knowledge module will be combined with competency units and a biweekly rotation system will be introduced to reduce organisational costs. Finally, a closed-loop promotion mechanism will be established for the capability iteration of dual-qualified teachers, and according to the semester-by-semester skill tracking report and performance conversion coefficient, regular cycles of identification, training, verification and update will be conducted. In the future, the scope of application for the three pathways will be expanded to all kinds of professional clusters; with the help of digital technology, improvements in mapping efficiency will be made; and how to quantify and share the costs of teaching coordination among multiple enterprises in parallel will also be studied. In addition, the boundary of flexible authorisation for professional cluster leaders in the internal governance of private higher vocational colleges also needs to be studied.

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