

Empirical Study on Professional Group Evaluation—A Case Study of Water Conservancy Construction and Management

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ABSTRACT

The evaluation work of professional group construction can promote and strengthen the construction of teaching quality assurance system. On the basis of refining, the connotation of professional group, the evaluation model of the weighted average comprehensive standard is constructed, and the calculation method of the weight of each index is determined. Finally, an empirical study is carried out with the example of the specialty group of water conservancy construction and management. The model is used to make a comprehensive evaluation of the construction of water conservancy construction and management specialty, and the value is 0.8124, which shows that the band effect of the school is basically formed. The construction of teaching resources is the core in the comprehensive evaluation of water conservancy construction and management professional group construction.

Keywords: *professional group, evaluation, water conservancy construction and management, brand effect, teaching resources*

1. INTRODUCTION

Because the specialty construction and evaluation of higher vocational education have great limitations, it is difficult to give full play to the cluster advantage of specialty and improve the overall level and benefit of specialty construction. In order to serve the development of local or industry as the starting point, higher vocational colleges actively carry out the construction of professional groups with key specialties as the core. This has played a positive role in optimizing the professional structure, showing the characteristics of running a school, cultivating professional competitiveness and strengthening the core competitiveness of the school[1-3].

The evaluation of professional group construction is the activity process of value judgment. "Why to evaluate "," what to evaluate" and "how to evaluate" are the three most important questions[4]. By carrying out the evaluation work of professional group construction and standardizing the management of professional group construction, we can promote and strengthen the construction of teaching quality assurance system of professional group.

But so far, the Ministry of Education has not published the index system of the evaluation of the construction level of professional groups, and the colleges and universities have only stayed in the stage of spontaneous exploration for the construction and evaluation of professional groups. Therefore, to further promote the construction of professional groups and promote the scientific,

institutionalized and standardized management of professional groups, it is particularly necessary to evaluate professional group construction^[5]. Through investigation and research, this paper understands the elements, contents and composition of professional quality evaluation system in the process of professional group construction in higher vocational colleges in China, draws lessons from the advanced points and successful experiences of these colleges, and combines the present situation of professional group construction to promote the improvement of professional group construction quality in higher vocational colleges.

2. CONNOTATION OF PROFESSION GROUPS

A professional group is important content and carrier of higher vocational education reform and construction in recent years. Its concept draws lessons from the idea of "industrial cluster". Generally, it consists of 1~2 key majors and 3~5 majors around a certain technical field or service field[6].

With the deepening of practice, the connotation of professional groups is continuously expanded and perfected, including the following contents.

3.1. The essence of a professional group is to organize existing specialties into "groups"

At present, professional groups are constructed according to the industrial chain of professional service, the occupational post group of service, the existing teaching resources, and the strategy based on the subject foundation. In practice, industry chain strategy based on professional service should not lack the content of industry chain extension field. The strategy of professional post group based on professional service should include the related post group and its intersection and derivative post, and the teaching resources should take into account the social openness and public welfare resources, so as to reflect the development and transformation gene of professional group.

3.2. Professional group is an innovative measure to construct "endogenous" professional construction mechanism in higher vocational colleges

Under the condition that the existing management pattern is difficult to change greatly, the innovation of the existing professional construction mechanism and the establishment of a flexible and reconfigurable mechanism to meet the needs of the construction of professional groups are innovative measures to break through the rigid constraints of the existing teaching by the administrative structure and realize the self-breakthrough and "endogenous" construction of higher vocational colleges. Through the establishment of cross-departmental joint meeting system of professional groups, the organization of flexible courses (groups) based on direction, forming the main body of responsibility for core professional construction, leading the construction and development of professional groups.

3.3. Teaching resource is the link of professional group

Due to the restriction of system and mechanism, the achievements of quality teaching resources, reform and construction only benefit the leading specialty and the key specialty. The construction of professional group can expand the application field of professional resources, such as base, curriculum, teacher and so on, which can expand the established division of personnel training, which is an important measure to alleviate the imbalance of professional resources distribution, low performance, and too concentrated in the current situation of superior specialty. Teaching resource is the link of professional group, and its sharing degree determines the agglomeration and diffusion effect of professional group, which is the key point and difficulty of professional group construction.

3. CONSTRUCTION OF PROFESSIONAL GROUP EVALUATION MODEL

According to the basic attributes and overall level of water conservancy construction and management major in higher vocational colleges, combined with the reality of regional economic development in Hunan Province, and according to the principles of outstanding characteristics, mutual independence and impartiality and objectivity of information data sources, Delphi method was used to consult and feedback 20 experts, scholars, education department and water conservancy department of Hunan province. The system consists of six first-level indicators, such as the advantages of professional group construction, student development, teaching staff, teaching resources, social services and international cooperation.

3.1. Index weight calculations

In the determination of the weight of the first-order index and the second-order index, because the dimension of the third-order index coefficient is not uniform, the range standardization method is used to standardize the index coefficient, so that the standardized values of the measured index are between 0 and 1.

$$Z_{ij} = \frac{X_{ij} - \min X_{ij}}{\max X_{ij} - \min X_{ij}} \quad (1)$$

The Z_{ij} in formula (1) is the standardized value of the j index in the i sample; the X_{ij} is the j index value in the i sample; the maximum of the j index in the i sample; and the minimum of the index in the i sample.

3.2. Weight of indicators determined

Entropy method is a more objective weight calculation method, which can better avoid the influence of human factors and help to reduce the error. The improved entropy method is used to determine the weight of each index. The model is formulated as follows:

$$E_{ij} = \frac{1}{\ln N} \sum (Z_{ij} \times \lg Z_{ij}) \quad (2)$$

where the E_{ij} is the entropy of the desired information; N is the number of samples. At $Z_{ij}=0$, make its approximate pair equal to 0.000 001, then the weight is W_{ij}

$$W_{ij} = \frac{1 - E_{ij}}{\sum (1 - E_{ij})} \times 100\% \quad (3)$$

3.3. Comprehensive Evaluation Model for the Construction of Professional Groups

Using formula (1), formula (2) and formula (3) to establish the weighted average comprehensive standard model, that is, formula (4), the comprehensive evaluation model of water conservancy construction and management specialty group in higher vocational colleges is constructed. When the general set index value is 1, the professional group construction is in a perfect state; when 0, the performance is absolutely poor; when equal to 0.5, it is medium level, the larger the index value indicates that the construction performance is better.

$$P = \sum_{i=1}^6 \sum_{j=1}^m Z_{ij} W_{ij} \quad (4)$$

4. EMPIRICAL STUDY ON THE SPECIALTY GROUP OF WATER CONSERVANCY CONSTRUCTION AND MANAGEMENT

4.1. Summary of research cases

Hunan Water Conservancy and Hydropower Vocational and Technical College are approved by the provincial people's government, the Ministry of Education for the record, The only full-time public university in Hunan, Organized by the Hunan Water Conservancy Department, Hunan Education Department in charge of the business. 2008, The college was appraised as "excellent" in the first round of the evaluation of personnel training work level of the Ministry of Education, In 2013, the second round of personnel training was evaluated with all the outstanding achievements of qualified indicators; January 2012, The

Ministry of Water Resources has identified our institute as a demonstration institution for higher vocational education in water conservancy and a national designated training institution for water conservancy; July 2013, Hunan Education Department identified our institute as Hunan Province model (backbone) higher vocational colleges, Hunan Province information pilot schools.

4.2. Data sources and research methods

Based on the relevant data of the annual report on school quality published by Hunan Province in 2016,2017 and 2018, and the policy documents such as the outline of Hunan National Economy and the 13th Five-Year Plan for Social Development, this paper compares the relevant data published by Hunan Education Department. The leaders of Hunan Provincial Education Department in charge of vocational education, the leaders of Hunan Provincial Water Conservancy Department, the principals of higher vocational colleges and vocational education experts, and the middle and senior leaders of industrial enterprises were interviewed and investigated.

4.3. Evaluation and Analysis of Construction of Water Conservancy Construction and Management Specialized Groups

4.3.1. Comprehensive analysis on evaluation of construction of water conservancy construction and management specialty group

Statistical analysis of the obtained raw data was carried out using formula (1), formula (2), formula (3), and the result is presented in tables 1 and 2.

Table 1. Weight of Evaluation Index for Construction and Management Specialty Group

Level I weight index	Level II weight index				Level I weight index	Level II weight index		
Professional group construction advantage 0.0062	Orientation of Professional Group Construction	Rationality of Professional Groups	Construction security mechanism	Core competencies	Teaching resources 0.3535	Curriculum resources	Training conditions in schools	Practical Teaching Conditions for School-Enterprise Cooperative Construction
	0.0015	0.0015	0.0006	0.0026				
Student development 0.3266	Student size in the group	Study status of students in groups		Employment status of students in groups	Social services 0.2225	Social training		Technical services
	0.0631	0.1246		0.1389		0.1101		0.1124
Teaching staff 0.1279	Quantity and structure	Teaching and scientific research	Quality of lectures	Communication and enhancement	International cooperation 0.0477	Student situation		Teachers
	0.0262	0.0299	0.0413	0.0305		0.0261		0.0216

Table 2. Comprehensive Evaluation Table of Construction and Management Specialty Group

Indicators elements and scores		Evaluation value	Weight	Total score	Indicators elements and scores		Evaluation value	Weight	Total score
Advantages of professional group 0.0042	Orientation of Professional Group Construction	0.56	0.0015	0.0008	Teacher staff 0.0968	Quantity and quantity Structure	0.69	0.0262	0.0181
	Rationality of Professional Groups	0.64	0.0015	0.0009		Teaching and scientific research	0.71	0.0299	0.0212
	Construction security mechanism	0.55	0.0006	0.0003		Quality of lectures	0.89	0.0413	0.0368
	Core competencies	0.84	0.0026	0.0022		Communication and communication Increase	0.68	0.0305	0.0207
Student development 0.2459	Student size in the group	0.60	0.0631	0.0379	Teaching Resources 0.3055	Curriculum resources	0.88	0.1221	0.1074
	Study status of students in groups	0.71	0.1246	0.0885		Training conditions in schools	0.88	0.1201	0.1057
	Employment status of students in groups	0.86	0.1389	0.1195		Practical Teaching Conditions for School-Enterprise Cooperative Construction	0.83	0.1113	0.0924
International cooperation 0.0354	Student situation	0.73	0.0261	0.0190	Social services 0.1247	Social training	0.52	0.1101	0.0573
	Teachers	0.76	0.0216	0.0164		Technical services	0.60	0.1124	0.0674
Total score of comprehensive evaluation of water conservancy construction and management professional group 0.8124									

Table 2 shows that the total score of comprehensive evaluation of construction performance of water conservancy construction and management specialty group is 0.8124, which is higher than the middle level, which shows that the construction of this characteristic specialty group has achieved remarkable results, and the quality of personnel training, the level of social service, the ability of radiation driving and the overall strength of running a school have been greatly improved.

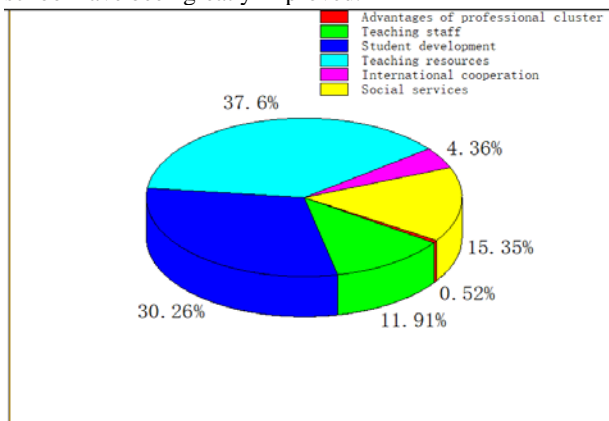


Figure 1. Percentage comparison of Level I weight index

Figure 1 shows the percentage comparison of the Level I weight index. In the evaluation index system of water conservancy construction and management specialty group construction, the highest weight index is teaching resources, which ratio is 37.6%. First place, teaching resources can be used as the core index to evaluate the construction of water

conservancy construction and management specialty group. It plays a decisive role in the construction of professional groups. The second priority is student development, which construction performance evaluation is divided into 0.2459 and 30.26%. This is mainly related to the school pays great attention to the ideological and political quality of students and the development of comprehensive quality. In particular, the employment status of graduates satisfaction with enterprise satisfaction with graduates reached more than 97% and other factors. In the comprehensive evaluation form of professional group construction. Third place is social services, the index weight is 0.1247 and 15.35%, This is due to the school-issued by the Ministry of Education on the innovative development of vocational education action plan (2016-2018) and Hunan Province, the spirit of the relevant documents, which adheres to local economic and social development needs, connects with industrial restructuring and economic transformation, actively serves local economic development, as well as social service capacity, increased significantly in 2018. In the last two years, the school improved the ability of teachers' ability to teach, according to the principle of combining interval training with external guidance, through the selection of full-time teachers to well-known universities, national backbone higher vocational colleges, the Ministry of Education higher vocational teachers training base for skills training, but the evaluation index weight and the comprehensive evaluation score of the teaching staff are 0.127 and 0.0968, which ratio is 11.91% and in fourth place, shows that the construction of teaching staff needs to be improved. In terms of international cooperation, its total score in the comprehensive evaluation of the construction of first-class specialty group is only 0.0354, which ratio is 4.36%, should be taken seriously, and

take the "Belt and Road" construction as an opportunity, active international exchanges and cooperation, to promote international school brand.

4.3.2. Evaluation and analysis of teaching resources construction

Table 1 and Table 2 show that the construction of teaching resources is in the core position in the comprehensive evaluation of water conservancy construction and management specialty group construction. From the comprehensive evaluation rankings, school training conditions ranked first, which is related to the complete training conditions in the school. The college establishes two professional entity companies; there are 22 in-school training rooms, such as simulation training rooms for three-level hydraulic engineering hubs, with 1065 sets of training facilities, and worth 12.5406 million yuan. There are 34 out-of-school training bases and 1223 out-of-school practice units, which can meet the needs of teaching, production, training, appraisal and technical services. The completion rate of training equipment and the opening rate of training projects reached 100%.

The comprehensive score of curriculum teaching resources evaluation is 0.1074, ranking second. Since 2016, the college has built a number of digital curriculum resources of high-quality curriculum standards, teaching design, teaching materials, teaching video or micro-class, teaching case set, test questions database and other resources in the construction of curriculum resources, and is open in the school curriculum reform information management platform for teachers and students in higher vocational colleges in the province to enjoy.

5. CONCLUSION

Using the weighted average comprehensive standard model to make a comprehensive evaluation of the construction of water conservancy construction and management professional group, the result is 0.8124, which shows that the construction results are remarkable, the conditions and quality of running a school are improved, and the brand effect of running a school is formed. The construction of teaching resources is in the core position in the comprehensive evaluation of water conservancy construction and management specialty group construction in higher vocational colleges.

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