

# Using Big Data Technology to Integrate High-Quality Resources, Schools and Enterprises Cooperate to Develop Electric Power Vocational Skill Grade Certificates

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**Keywords:** Vocational Skill Grade Certificate, Integrate Resources, School Enterprise Collaboration, Big Data Technology.

**Abstract:** In order to fully implement the vocational education reform work deployment of the Party Central Committee and the State Council, State Grid of China Technology College (hereinafter referred to as the "college") fully integrates high-quality resources by using big data technology, actively cooperates with vocational colleges and provincial companies of State Grid Corporation of China, and plays an important role in organizing, coordinating, supporting and guaranteeing the application for power vocational skill level certificates. The college has taken the lead in the development and application of vocational skill level certificates, and has successfully been shortlisted for 9 vocational skill level certificates, further promoting the integration of industry and education, and realizing the seamless connection between the talent supply side and the industry demand side.

## 1 INTRODUCTION

From 2019, the state will start the pilot work of the "diploma+several vocational skill level certificates" (hereinafter referred to as "1+X") system in vocational colleges and application-oriented undergraduate universities (Dai, 2020). "1+X" is an important system design for the country to implement the fundamental task of establishing morality and cultivating people, improve the vocational education and training system, and deepen the integration of industry and education and school enterprise cooperation (Du, 2021). The vocational education training evaluation organization (hereinafter referred to as the "training evaluation organization") is the main body of the construction of vocational skill grade certificates and standards (Hu, 2020). Its main responsibility is to cooperate with industries, enterprises and colleges to carry out the development of vocational skill grade standards, textbooks and learning resources, the construction of examination sites, assessment and certification, and assist the pilot vocational colleges in implementing certificate training (Dai, 2019).

## 2 IMPLEMENTATION BACKGROUND

### 2.1 Fully Implement the National Vocational Education Reform

In order to thoroughly implement the vocational education reform work deployment of the Party Central Committee and the State Council, and fully implement the requirements of the National Vocational Education Reform Implementation Plan and the Pilot Plan for the Implementation of the "Diploma+Several Vocational Skill Grades" System in Colleges and Universities, the Ministry of Education is organizing the application work of the training evaluation organization, the construction subject of vocational skill grade certificates and standards, the 1+X certificate system is precisely aimed at the practical problems such as the quality of vocational education can not meet the market demand, and vocational education learners' entrepreneurship and employment ability is not enough (Li, 2019). It can completely solve the last mile of vocational education connecting with the job

needs of enterprises. It is an effective way to implement vocational education reform (Liu, 2020).

## **2.2 The Company Fully Promotes the Integration of Production and Education to Improve the Quality of Talent Training**

After careful study and consultation with the Ministry of Education, the Human Resources Department of State Grid Corporation of China suggested that the company be the main body to apply for training evaluation organization, which was signed and approved by the company's main leaders. Firstly, the company applied for the training evaluation organization, which demonstrated the good image of the company as a super large state-owned key backbone enterprise that has the courage to undertake the key tasks of vocational education reform, and reflected the political, historical and responsibility of the company; Second, it is conducive for the company to take the lead in formulating national vocational education standards, connect with the company's skill level evaluation system, promote the integration of industry and education, promote the integration of documentary evidence, achieve the seamless connection between the talent supply side and the industry demand side, and make the talent training standards more consistent with the company and industry needs; Third, it will help the company improve vocational education and training system, optimize talent training mode and evaluation mode, and improve the training quality of compound high skilled talents (Li, 2019).

## **2.3 The College Actively Undertakes the Implementation of Vocational Education Reform**

As an educational and training unit directly under the company and a vocational college, the college shoulders the sacred mission and major responsibility of cultivating qualified socialist builders and successors, and cultivating excellent industrial workers and "state grid craftsmen". The college is mainly responsible for the training of new employees, high-level technical and skilled personnel, scarce personnel, international training and vocational education (Luo, 2020). The operation and management of the company's network university has unique advantages in the application for training evaluation and organization. As the

leading unit of vocational education in the company, the college must actively undertake the pilot work of comprehensively implementing the 1+X system, implement the evaluation organization of vocational education training and the application of vocational skill grade certificate.

## **3 PRIMARY OBJECTIVE**

The declared training evaluation organization meets the company's strategic requirements. In recent years, although the scale of higher vocational education in China has been expanding, its quality has not yet fully met the needs of industry enterprises for talents. This year, the company has set the strategic goal of building "an international leading energy Internet enterprise with Chinese characteristics"(Pan, 2020). As an important pillar of the strategic support, the company's vocational education should also keep pace with the times, accelerate the pace of transformation and upgrading, explore the path of innovative development, and create an integrated system of international leading vocational education and enterprise education with Chinese characteristics.

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## **4 APPLICATION PROCESS OF VOCATIONAL SKILL GRADE CERTIFICATE DEVELOPMENT**

According to the requirements of the Ministry of Education's Announcement on Recruitment of the Fourth Batch of Vocational Education Training

Evaluation Organizations, the College, as the leading unit of the application, has successfully completed the application with the strong assistance of 12 vocational colleges and 11 provincial companies. Now, the application process is reported as follows. The declaration process is shown in Figure 1.



Figure 1 The declaration process

## 4.1 Design Process

The target of vocational skill grade certificate is the professional quality, professional knowledge and professional skills corresponding to typical posts (groups). The college sorted out various typical posts (groups) in the power industry through big data analysis and questionnaires, and determined a list of post skills with market demand, clear posts and broad development prospects for posts (groups) with "mature technical skills" and "clear professional ability structure". At the same time, depending on the company's vocational education advantages, through the demonstration of experts in the industry and representatives of staff at various posts, 11 professional skill level certificates have been developed, including transformation and distribution operation and maintenance, relay protection maintenance, transformation equipment maintenance, power cable installation operation and maintenance, meter connection, distribution line operation and maintenance, primary transformation installation, secondary transformation installation, distribution operation and maintenance and marketing services, electrical testing Transmission line construction, operation and maintenance. The 11 vocational skill level certificates basically cover the skills of major posts in the power industry, such as construction, operation and maintenance, overhaul and marketing services.

Use 13-point type for the subtitle, aligned to the center, line space exactly at 15-point with bold and italic font style.

Words like "is", "or", "then", etc. should not be capitalized unless they are the first word of the subtitle. The initial letters should be capitalized. No formulas or special characters of any form or language are allowed in the subtitle.

## 4.2 Development Process

### 4.2.1 Organizational Development

The college took the lead in organizing 7 vocational colleges and 19 provincial companies in the company to form a development team of 11 certificates. The college, based on the national vocational standards, the company's post training specifications for skilled personnel and skill grade evaluation standards, combined with the needs of enterprises and vocational colleges (groups), and fully understood the 1+X system and the first batch of vocational skill grade standards, The Company's Vocational Skill Grade Certificate and Standard Development Guide and Work Plan were determined. Eleven electric power vocational skill grade certificates were developed, and each certificate developed three parts: standard, question bank, necessity and feasibility report according to the development guide.

The College has formulated the Evaluation Standards for Vocational Skills Grade Standards and Question Bank of Vocational Colleges, listed evaluation standards for 11 major categories and 31 sub categories of content elements of each certificate, and led the organization of 12 vocational colleges and 10 production units in the company to carry out centralized evaluation in the Jinan Campus of the College. The evaluation experts put forward corresponding modification suggestions for the content. Subsequently, the compilation and development team modified and improved the content of the certificate.

### 4.2.2 Optimization Sage

The Ministry of Education issued the Guidelines for the Development of Vocational Skill Grade Standards (Draft for Comments) and the Announcement on the Scheme for Setting the Upper Limit of the Examination Cost of Vocational Skill Grade Certificates Implemented in Colleges and Universities, which put forward clear requirements for the development of vocational skill grade standards and certificates. The college immediately organized relevant personnel to interpret the new standards and requirements, formulate the document

list and document template for certificate development, and prepare relevant documents according to the unified idea and template, which laid a solid foundation for the high-quality preparation of 11 certificates in the later period. In order to ensure the smooth progress of the development work with high quality, the College and each certificate development unit (involving 18 units, distributed in 15 provinces and cities) used online meetings, telephone contact, We-chat communication, mail transmission and other forms to communicate regularly, constantly improve and revise, and collaborate to improve the X certificate for three times. After this round of optimization and improvement, each X certificate has formed seven annexes, which are: vocational skill level standard, relevant pilot matter description, assessment scheme, assessment site construction standard, assessment cost accounting scheme, assessment expense item list and calculation basis, necessity and feasibility report. So far, the development of 11 vocational skill level certificates has been basically completed.

### 4.3 Declaration Process by Big Data Technology

#### 4.3.1 Studying Documents and Breaking Down Tasks

The College carefully studied the relevant documents such as the Administrative Measures for the Selection and Supervision of Vocational Education Training Evaluation Organizations, the Notice on the Recruitment of the Fourth Batch of Vocational Education Training Evaluation Organizations, prepared the Work Plan for the Application of the Fourth Batch of Vocational Education Training Evaluation Organizations, put forward the general idea and principles for the preparation of application materials, and defined the tasks and time nodes of each unit in the company in the preparation of application materials, The entries and forms in the declaration system shall be broken down to corresponding units and personnel.

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#### 4.3.2 Overall Planning of Resources and Centralized Filling

File capacity (Unit: GB)

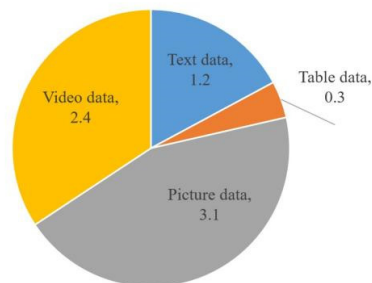


Figure 2 Classification of material data

The college makes overall plans for the 12 provincial training centers and vocational colleges in the company to separately count the training guidance scheme, assessment outline, sample question bank, teaching materials, online learning resources, expert teacher team, management system, agreement text and other materials. Subsequently, the College sorted out and summarized all the application materials of about 7GB, and the classification of all material data is shown in Figure 2. The final effective declaration data is shown in Figure 3 through the consolidation and summary of big data technology. 20 teachers were organized to carry out online reporting, and the college finally completed the preliminary review, sorting, printing and mailing of paper materials.

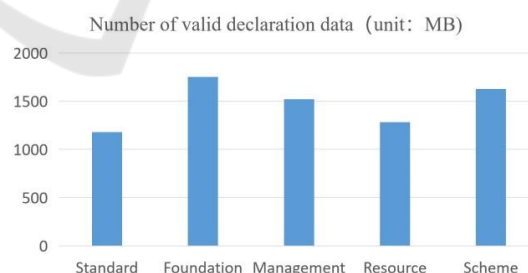


Figure 3 The number of valid declaration data

The big data technology currently used is shown in Figure 4.

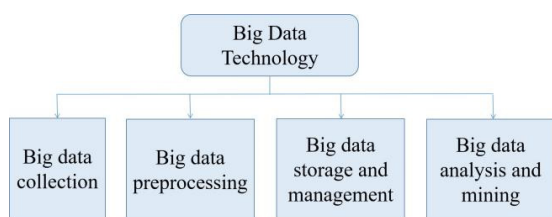


Figure 4 The big data technology used

#### 4.4 Improvement Process

After receiving the modification opinions from the Ministry of Education, the College, through telephone consultation with the relevant personnel of the Ministry of Education, lists the modification and improvement materials, prepares various supporting materials in a timely manner, and communicates with the Human Resources Department of the Company in a timely manner, finally completes all the application and improvement materials, including the recognition of vocational skill grade certificate and the description of use intention, and reports more than 150 documents to the Ministry of Education.

### 5 CONDITION GUARANTEE

#### 5.1 Policy Guarantee: Meeting the Requirements of National Vocational Education Reform

The requirements of the Party Central Committee and the State Council on vocational education reform: fully implement the National Plan for the Implementation of Vocational Education Reform and the Pilot Plan for the Implementation of the "Certificate of Education+Several Vocational Skill Grades" System in Colleges and Universities. The Ministry of Education organized the application of vocational education training evaluation organization, the construction subject of vocational skill grade certificates and standards, providing a way to implement the requirements of national vocational education reform.

#### 5.2 Resource Guarantee: the Strong Support from the Company

The application of vocational education training evaluation organization has been affirmed and supported by the company's leaders and the company's human resources department. The Human

Resources Department of the Company prepared the Application for Application of Vocational Education Training Evaluation Organization of the Ministry of Education, which was signed and approved by the main leaders of the Company. In the process of implementation, the College received strong support from the Human Resources Department of the Company, and convened vocational colleges and provincial companies to form a development team; When making statistics on relevant training resources, the Human Resources Department of the Company held a promotion meeting, which provided effective guarantee for efficient and accurate collection of data.

### 6 ACTUAL EFFECT AND PROMOTION VALUE

By actively developing the professional skill grade certificate of State Grid Corporation of China, the requirements of the CPC Central Committee and the State Council for vocational education reform were implemented, and the company's good image as a super large state-owned key backbone enterprise was highlighted.

According to the implementation requirements of the 1+X certificate system, in the next step, each vocational college needs to integrate the X certificate into the training of professional talents. According to the requirements of vocational skill grade standards and professional teaching standards, the certificate training content should be organically integrated into the training plan of professional talents, optimize the curriculum and teaching content, coordinate the teaching organization and implementation, deepen the reform of teaching methods, and improve the flexibility, adaptability and pertinence of talent training.

After expert selection, publicity, verification of enterprise credit and tax related information, review and other procedures, it was submitted to the inter ministerial joint meeting of the vocational education work of the State Council for deliberation. The Ministry of Education issued the Notice on Authorizing to Issue the List of the Fourth Batch of Vocational Education Training Evaluation Organizations and Vocational Skill Grade Certificates Participating in the 1+X Certificate System, formally determining the shortlisted vocational education training evaluation organizations of State Grid Corporation of China, Nine certificates, including relay protection



maintenance, were shortlisted for vocational skill level certificates, and participated in the pilot of the 1+X certificate system. The company became the vocational education training evaluation organization with the most shortlisted certificates, and the college played an important role in organization, coordination, support and guarantee. The company has become the vocational training evaluation organization with the largest number of shortlisted certificates, and the college, as the leading unit of this work, has assisted the human resources department of the company to make positive contributions. The fourth batch of application for vocational education training evaluation organizations organized by the Ministry of Education, the Ministry of Education received a total of 984 pilot applications submitted by 602 units. After the procedures of expert selection, publicity, verification of enterprise credit and tax related information, review and other procedures, it was submitted to the inter ministerial joint meeting of the vocational education work of the State Council for deliberation. It was determined that 355 vocational skill level certificates from 270 vocational education training evaluation organizations participated in the 1+X pilot, with a passing rate of 36%. Nine of the 11 certificates declared by State Grid Corporation were successfully shortlisted, and the college played an important role in organization, coordination, support and guarantee.

As an education and training unit directly under the company and a vocational college, the college has fully played the role of the Vocational Education Development Research Center, actively contributed to the development and reform of the company's vocational education, further promoted the integration of industry and education, documentation and certification, and optimized the talent training model and evaluation model.

## 7 CONCLUSIONS

The development of vocational skill grade certificates is a necessary way and means for the College to promote the integration of industry and education in vocational education. In the next batch of development process, the college should continue to plan in advance according to the requirements of the relevant documents of the Ministry of Education, introduce more experts and talents from the industry to participate in the development work, and do a good job in publicity and promotion to improve the

adaptability and influence of the certificate in the industry. In terms of the content of certificate development, the cost of certificate implementation will be further reduced on the premise of ensuring the improvement of skills, so as to improve the rationality and commonweal of the certificate price.

The evaluation of vocational education and training is highly policy oriented, involves a wide range and involves a large workload, which is related to the social reputation of the company and the vital interests of students. All units should unify their thinking, improve their understanding, enhance their sense of responsibility and mission, take the initiative to promote, and ensure that the important task of vocational education reform is completed with high quality.

All units should make use of various forms to publicize, implement and explain policies, establish high-quality expert teams from industry enterprises, colleges and research institutions, regularly carry out teacher training and exchanges for pilot colleges, improve teachers' ability to implement teaching, training, assessment and evaluation, and steadily and orderly promote the company's vocational education training evaluation.

All units should strengthen process control, conscientiously summarize experience, and continuously improve the level of vocational education and training evaluation. The Company shall establish a quality supervision mechanism, carry out random quality inspection and work inspection from time to time, and report the results of random inspection.

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