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*Original Paper*

# Research on Degree Program Construction Platform Scheme Based on Data Fusion Thinking

Hairu Guo[1*], Shui Ju[2], Xiaoyan Jia[3] & Junyi He[4]

[1] Graduate School, Henan Polytechnic University, Jiaozuo, China

[2] School of Mechanical and Power Engineering, Henan Polytechnic University, Jiaozuo, China

[3] Information Construction and Management Center, Henan Polytechnic University, Jiaozuo, China

[4] School of Computer Science and Technology, Henan Polytechnic University, Jiaozuo, China

[*] Hairu Guo, Graduate School, Henan Polytechnic University, Jiaozuo, China

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***Abstract***

*The article analyzes the existing system for evaluating the construction of degree programs, sorts out the requirements for various work tasks such as application, assessment, evaluation, and inspection, and extracts various data information related to the direction, teachers, students, teaching and research, process, quality, and other aspects of degree program construction. On this basis, a degree program construction platform scheme was designed using data fusion thinking, taking into account all relevant work related to degree program construction, and unifying the management of data related to degree program construction. This has a positive promoting effect on the long-term construction and efficient management of degree programs, and is also a beneficial attempt to modernize the governance system and governance capabilities of the degree programs.*

***Keywords***

*degree program construction, degree program assessment, degree program evaluation, data fusion thinking, platform scheme*

## 1. Introduction

At the National Conference on Graduate Education held in July 2020, General Secretary Xi Jinping raised graduate education to a new height, pointing out that the development of the Party and the country urgently needs to cultivate a large number of high-level talents with both ability and integrity, and postgraduate education shoulders the important mission of cultivating high-level talents and innovation and creation (2020). Degree programs are the carriers of postgraduate education, which play an important role in cultivating innovative talents, improving innovation capabilities, serving economic and social development, and promoting the modernization of the national governance system and governance capabilities.

In the process of the construction of degree programs, relevant entities such as national education authorities at all levels, degree-granting units and professional institutions for education evaluation have carried out a series of special work such as authorization review, qualification assessment, and level evaluation. Due to the different tasks and requirements related to the construction of various degree programs, the large amount of data filled in and the high degree of similarity, a unified degree program construction status monitoring platform is built to uniformly manage the data related to the construction of degree programs, so as to improve the efficiency of degree program construction.

Li Changbo et al. (2015) have carried out relevant research on the construction of degree program self-assessment system under the perspective of big data, which has a certain reference role in making full use of evaluation data for the efficient construction of degree programs. Sun Qingping (2021) thought and practiced the construction of graduate education management system in the era of big data, and proposed strategies such as establishing a unified standard database and enhancing the integration of the system in the face of diversified digital methods, diversified education data, and comprehensive education quality evaluation. Zhang Xiang et al. (2016) have made useful explorations in the normalization of degree program quality information monitoring based on big data, and realized data screening and integration, mining and analysis, and feedback and utilization.

However, there is little research on the overall consideration of the existing degree program construction evaluation tasks and the construction of a comprehensive data fusional degree program information platform scheme, this paper comprehensively sorts out the data requirements of various tasks, and designs a data fusional platform scheme that can make full use of the relevant data of degree programs, so as to lay a good foundation for building a related platform in the future.

## 2. Evaluation System for the Construction of Degree Programs

The degree program carries the various functions of postgraduate education, and the internal construction mainly includes four tasks: academic team, discipline direction, discipline culture, and resource platform, and the external performance mainly includes talent training, scientific research, social service, and discipline reputation. The existing degree program construction evaluation system (2020) includes degree authorization review (application), degree program special qualification assessment, degree program periodic qualification assessment, discipline evaluation (equivalent to academic degree program level evaluation), professional degree level evaluation, degree program special inspection, degree program dynamic adjustment, Double First-Class discipline construction, etc., involving government departments (the Academic Degrees Committee of the State Council, the Ministry of Education, and provincial degree authorities), social institutions (degree centers of the Ministry of Education, etc.) and various postgraduate training units.

In this system, there are not only degree authorization reviews carried out in accordance with the application standards to determine whether degree programs can be accessed, but also dynamic adjustment or even forced withdrawal of degree programs according to evaluation standards; There are not only various evaluations to test the construction quality level of degree programs from different angles, but also special inspections that focus on the quality of process construction; There are not only government-led, compulsory participation, inspection and training quality, and bottom-line qualification assessment, but also evaluation carried out by professional institutions, which is voluntary participation, reflect strength, highlight the level of characteristics; There are both special qualification assessments for new degree programs authorized after three years, and periodic qualification assessments every six years for degree programs. All kinds of work have their own emphasis, serving different needs, playing an important role in the construction of degree programs and the quality assurance of graduate education from different angles, together constitute a complete degree program evaluation system.

## 3. Data Related to the Construction of Degree Programs

Degree authorization review, degree program special qualification assessment, degree program periodic qualification assessment, discipline evaluation (equivalent to academic degree program level evaluation), professional degree level evaluation, degree program special inspection and other relational work need to fill in the data involved in the discipline direction, faculty team, talent training, scientific research, condition guarantee, etc. The content is similar, but each has its own emphasis, the workload is large, and the form is different.

If the data is collected separately for each work, the collection work is complicated, and will cause great data redundancy. It is also not easy to analyze the construction status of degree programs from a large amount of data. If the data collection requirements of each work can be analyzed scientifically

and reasonably, and a data collection platform based on data fusion thinking can be established, the workload of filling in data can be greatly reduced, and at the same time, the collected data can be cleaned and analyzed, and the potential hidden features can be explored through analysis and diagnosis, which can achieve the purpose of obtaining the most information with the least data, and can pay attention to the actual state of each degree program at every moment, so that the initial data generates value to support the scientific decision-making and effective management of the degree program by the training unit.

By combing the index system of degree authorization review, special qualification assessment, periodic qualification assessment, discipline evaluation, professional degree level evaluation, special inspection and other work related to degree program construction, it is found that although the collected information is not identical, it is found that although it is not identical, it has a great degree of similarity. A comparison of the indicator systems for each work is shown in Table 1.

**Table 1. Comparison of Indicator Systems Related to Degree Program Construction**

| **Work tasks** | **Indicator system** | | | |
|---|---|---|---|---|
| Degree authorization review | **Discipline direction and characteristics**<br>Discipline direction<br>Discipline Characteristics | **Discipline team**<br>Personnel size<br>Personnel structure<br>Discipline leaders and academic backbones | **Talent training**<br>Culture profile<br>Curriculum and Teaching<br>Culture quality | **Cultivation environment and conditions**<br>Scientific research<br>Academic exchanges<br>Support conditions |
| Special qualification assessment | **Objectives and standards**<br>Training goals<br>Degree standards<br>Discipline direction and characteristics | **Teaching staff**<br>Team structure<br>Tutor level<br>Moral style | **Talent training**<br>Graduate admissions and degree awarding<br>Main curriculum<br>Teaching awards<br>Results achieved by current students<br>Students participate in academic exchanges at home and abroad<br>International exchange of students<br>Employment of graduates | **Scientific research**<br>Number of scientific research Projects and scientific research funding<br>Scientific research achievements and transformation<br>Publication of academic papers<br>Cultivation environment and conditions<br>Academic exchanges at home and abroad<br>Science and technology innovation base<br>Instruments and facilities<br>Scholarships and grants |
| Periodic qualification assessment | **Objectives and standards**<br>Training goals<br>Degree standards | **Basic conditions**<br>Training direction<br>Teaching staff<br>Scientific research<br>Teaching and research support<br>Scholarship system | **Talent training**<br>Enrollment selection<br>Ideological and political education<br>Course teaching<br>Mentoring<br>Academic training<br>Academic exchanges<br>Paper quality | **Service contribution**<br>Scientific and technological progress<br>Economic development<br>Cultural construction |

| Work tasks | Indicator system | | | |
|---|---|---|---|---|
| | | | Quality assurance<br>Construction of study style<br>Management services<br>Employment development | |
| Discipline evaluation (Academic degree program level evaluation) | **Quality of talent training**<br>Effectiveness of ideological and political education<br>Quality of the cultivation process<br>Quality of students<br>Quality of graduates | **Faculty and resources**<br>Teaching staff<br>Platform resources | **Level of scientific research**<br>Scientific research results (and transformation)<br>Scientific research projects and awards | **Social service and disciplinary reputation**<br>Social services<br>Discipline reputation |
| Professional degree program level evaluation | **Quality of teaching**<br>Training program and characteristics<br>Effectiveness of ideological and political education<br>Quality of curriculum and practical teaching<br>Student satisfaction | **Quality of learning**<br>Learning outcomes<br>Student sense of acquisition | **Quality of career development**<br>Quality of graduates<br>Employer satisfaction<br>Service contribution and social reputation | |
| Special inspections | **Institutional construction**<br>Quality assurance system construction<br>Faculty development | **Curriculum building**<br>Classroom teaching effectiveness<br>Dissertation guidance | **Practical training**<br>Practice base<br>Industry mentors | **Selection criteria for doctoral supervisors**<br>**The mentoring processes**<br>**The situation of the people who cultivate virtue**<br>**Mentor support**<br>**Educational effectiveness initiatives** |

It can be seen in Table 1 that the first three of the six basic tasks are government-led, all involving the direction and characteristics, faculty and level, student training system and quality, scientific research achievement output, support condition construction, etc., and the data can be divided into degree program basic information, teacher information, training process information, training quality information, scientific research information, construction condition information, etc. The next two level evaluations are third-party evaluations, focusing on the quality of talent training and social services, and the data can be divided into basic information of degree programs, teacher information, training process information, training quality information, scientific research information, student information, typical service contribution cases, satisfaction surveys, etc. The special inspection mainly supervises and inspects the training process, and the data mainly involves the basic information of degree programs, teacher information, training process information, system construction, daily management,

industry-education integration information, etc.

## 4. Data Platform Scheme of the Degree Program Construction

### *4.1 Platform Design Ideas*

According to the aforementioned analysis, in the design of the data platform scheme, the data requirements of various projects can be coordinated, a data fusion information platform applicable to the whole process of degree program construction can be established, and the data can be turned into useful information through connection and integration, and finally converted into knowledge and generated by action and value through the analysis and diagnosis of the information, so as to realize the analysis and diagnosis of the degree program construction status, and support the scientific decision-making and effective management of the training unit.

The use of data fusion can also discover correlations that are unimaginable with experience, and through the new perspectives provided by these correlations, relevant data can be applied more scientifically and effectively. For example, it is more valuable to evaluate the quality of graduate training in the construction of degree programs and focus on studying which practical factors are more relevant to improving the quality of graduate training than to spend energy thinking about the reasons for the current situation. Because things are always evolving, the environment that previously affected the quality of training may not appear in the future, but factors related to the quality of postgraduate training are always present.

Quantitative data and relevant decision-making contexts can also be integrated for analysis. For example, in the process of academic team evaluation, analysts and diagnosticians not only need quantitative data such as the professional title, academic qualification, age, total number of supervisors and the proportion of supervisors with doctoral degrees of the main academic leaders and discipline echelons, but also qualitative data such as their academic level, teaching level and teacher style, and need to understand these data in the organizational process, organizational structure, and decision-maker value. In this way, the situation of providing data and analyzing data is separated from decision-making, providing information for reducing uncertainty in the decision-making process and improving the effectiveness of decision support.

### *4.2 Platform Function Module Design*

#### 4.2.1 Maintenance of Basic Information of Degree Programs

Maintain degree program information according to the discipline category, first-level (second-level) discipline, and professional degree category (field) defined by the state, including code, name, category, authorization level (master's, doctor), authorization time, lead college, support college, person in charge, secretary, remarks, etc.

4.2.2 Degree Program Core Data Structure Management

According to the basic information structure of degree programs filled in by national requirements, such as degree program application, special qualification assessment, periodic qualification assessment, discipline evaluation, professional degree level evaluation, etc., the basic information fields are refined, the information data structure is customized, and the correspondence between the existing data of the system (including the data obtained by teachers, teaching, scientific research, platforms, students, etc. from other systems in the university according to authority) and the special work data of various degree program construction is realized, so as to realize the transformation from the existing basic data to various national declarations, The format conversion of the data required for evaluation and other requirements is convenient for each degree program to carry out functions such as screening, querying statistics, import and export (docking with the national system) and other functions of subsequent filling data.

4.2.3 Management of Degree Program Cultivation Application

According to the content requirements of the "Profile Form" for degree program application and the requirements for cultivation project construction in Henan Province, the degree program secretary fills in the report (teachers, teaching and research, platform, students, etc.), on this basis, manually fill in other data, form the reported data, according to the authority level review (degree program secretary, degree program leader, college leader in charge, college leader, etc.), the administrator can set quantitative indicators for each filling content. And calculate the score according to the filling situation to achieve performance management.

4.2.4 Assessment Management of Degree Program Construction

According to the special qualification assessment, periodic qualification assessment, discipline evaluation, professional degree level evaluation, special inspection and other index systems for construction management, the page is set in accordance with the requirements of the corresponding work, the basic data can be obtained by the existing data in the system through the data format conversion in the basic information structure management of the degree program, and on this basis, each degree program will fill in the data screening, supplement and improve, and finally form the filling content that meets the relevant work requirements.

4.2.5 Basic Status Information Management of Degree Programs

According to the basic status information structure of degree programs required by the country in the periodic qualification assessment, the form function is customized, and each degree program can perform functions such as data screening, query statistics, import and export (docking with the national system) and so on.

4.2.6 Degree Program Performance Appraisal

According to the performance assessment methods of the degree programs, customize the form function, customize the assessment indicators and weights, and evaluate the construction of each degree program.

## 5. Conclusion

Degree programs are an important carrier for cultivating high-level talents, and their construction quality and level have an important impact on the quality of talent training. The data involved in degree program cultivation and application, various assessments or evaluations, special inspections and other related construction work have direction characteristics, teachers, training process, student quality, scientific research, support conditions, social services, etc., which are both generally similar and not identical. By analyzing and sorting out relevant tasks, refining the core data information of degree programs, a degree program construction platform scheme based on data fusion thinking was designed and proposed. It can reduce data redundancy, enhance data association, improve the comprehensive management level of degree program construction, promote the modernization of degree program governance system and governance capacity, and provide a solid guarantee for cultivating qualified high-level talents.

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