The Design of the Quality Control System for the Curriculum Construction in Colleges and Universities

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Abstract: With the promotion of the requirements of connotative development of colleges and universities, they need to adopt scientific means and methods to comprehensively design, organize and implement the teaching process. The quality of teaching lies in the quality of curriculum construction and teaching. Starting from the quality control of curriculum construction, this paper establishes the links that run through talent demand, training program, curriculum construction, teaching implementation, inspection and analysis, realizes the quality assurance information system in all aspects and processes, and applies it to the daily teaching management of Tianfu College of SWUFE, which has achieved good results.

1. Introduction

The main form of talent training in colleges and universities is curriculum teaching. The quality of curriculum teaching plays a fundamental role in the quality of talent training[1]. In the process of promoting the connotative development of higher education, in the final analysis, it depends on the quality of curriculum teaching. Therefore, high-quality teaching results depend on high-quality curriculum construction results. The final effect of any education depends on the course construction and implementation process facing students directly, so the course construction is the core link to improve the quality of higher education at present[2]. Based on the PDCA cycle concept, this paper tries to build a curriculum construction quality assurance system, and continuously collect, sort out and analyze the curriculum construction and teaching operation data, so as to timely find the weak links in the teaching process of teachers, and constantly improve, and then promote the continuous improvement of teaching quality.

2. Key Functions

2.1. Define the Course Objectives and Establish the Ability Course Matching Matrix

The curriculum construction is not isolated. It must be based on the talent training goal and carried out under the overall logical framework of the talent training program. Any curriculum construction that is separated from the talent training program is invalid.

The basic requirement of the quality control system of curriculum construction is to define how the curriculum supports the ability target on the premise of fully collecting, sorting out and analyzing the talent ability demand. The curriculum builder can establish the ability curriculum matching matrix, define the positioning of the curriculum in the personnel training program, and then determine the curriculum goal.

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Table 1 Competency course matching matrix.1

Ability Course	Course A	Course B	Course C	...
Capability 1				
Capability 2				
Capability 3				

2.2. Design Curriculum Standards

According to the national teaching quality standards of relevant courses, reasonably design the teaching content, define the assessment standards, and design the assessment tasks associated with the assessment standards. The system organizes the teaching content in modules, and each content module matches the course objectives. The course builder needs to design assessment tasks for each module to establish the relationship between assessment tasks and assessment points, and avoid invalid assessment items.

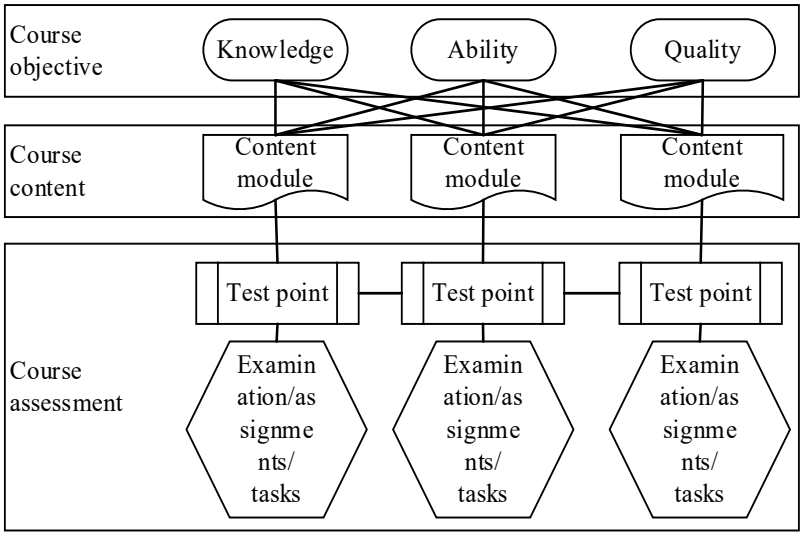

Figure 1 Curriculum standard design.

2.3. Teaching Design

Instructional design is an executive standard that transforms curriculum standards into classroom teaching. Based on the curriculum design standards, carefully analyze and study the logic between textbooks, reference materials, cases, existing curriculum resources, etc., combine the curriculum objectives and requirements, analyze the actual situation of students, and determine the number of units of this semester according to the specified class hours. In the course assessment items designed in the course standard section, reasonably select the assessment items, pay attention to students' learning effectiveness feedback in time, and provide data support for continuous improvement.

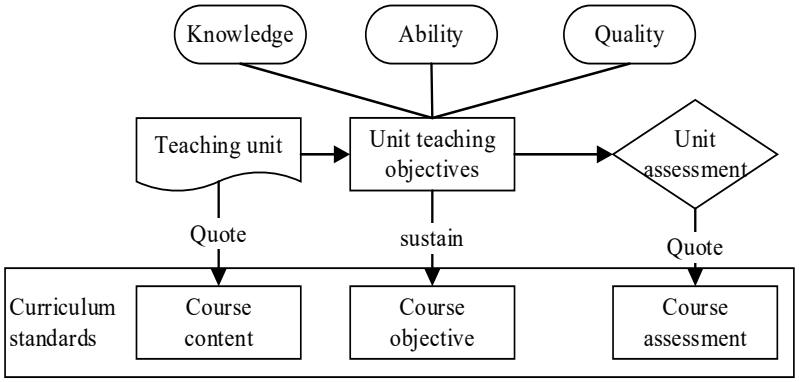

Figure 2 Teaching Content Design Process.

2.4. Evaluation and Feedback of Curriculum Construction Quality

Taylor pointed out that "as a process to judge the degree of realization of educational goals, evaluation needs evaluators to determine the behavioral evidence consistent with educational goals, and adopt the corresponding procedures to achieve the specific process"[3]. According to the specific work procedures such as "determining the curriculum construction plan and the methods needed to achieve the established goals", "preparation, implementation and implementation of the curriculum construction plan", "evaluation and diagnosis of the internal quality of the curriculum construction", "disposal or improvement of the implementation results based on the inspection and feedback information", carry out the spiral rise type of total quality management and control, so as to achieve the goal of improving the quality of the curriculum construction step by step[4]. In order to establish a quality culture system focusing on quality, involving all members and paying attention to student satisfaction, the curriculum construction quality control system is based on the PDCA cycle concept, establishes an evaluation feedback mechanism, and carries out targeted inspection, evaluation and feedback at different stages. First, establish an evaluation table, define the evaluation indicators and statistical methods, and then establish an evaluation plan to specify the participants and the evaluated. After the evaluation, the evaluated person shall propose rectification according to the opinions of the evaluator, and the evaluator shall check after rectification. Finally, the system generates the evaluation report according to the relevant content.

The quality control system of curriculum construction includes multi-dimensional inspection and feedback functions such as static data inspection, student evaluation/peer supervision evaluation/social evaluation, and the degree of achievement of curriculum objectives.

2.4.1 Inspection of Teaching Materials

In order to standardize the daily teaching management, ensure the accuracy and standardization of the data, according to the different roles and authorities, provide the school leaders, teaching department leaders, teaching secretaries, professional leaders, curriculum leaders, extramural experts and partners with different access to teaching materials, and give objective evaluation and feedback according to the evaluation tasks. The evaluator mainly inspects the teaching syllabus, teaching plan, courseware, reference materials, teaching videos, students' daily work, assessment of assessment project results, question bank construction, etc., and mainly inspects the scientificity, rationality, frontier, practicality and standardization of the materials. The inspected person shall rectify according to the inspection results and be reviewed again by the inspector. This process can be repeated many times to continuously improve the quality of teaching materials.

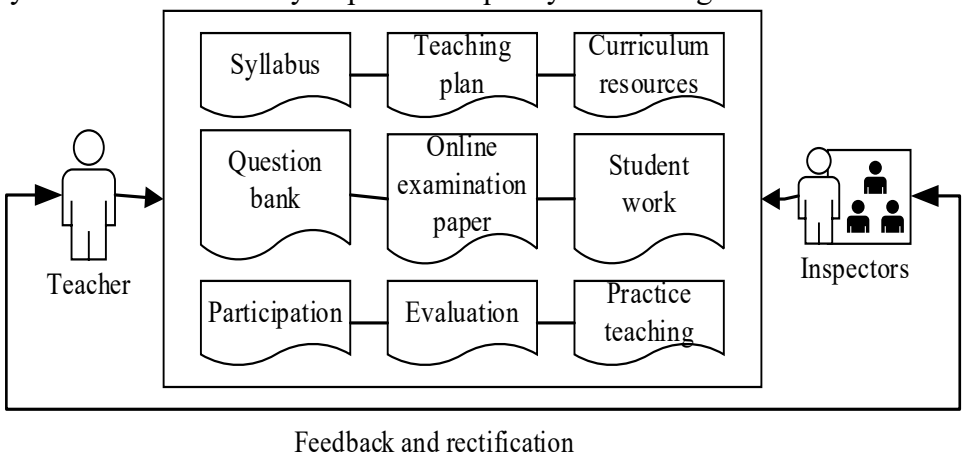

Figure 3 Inspection process of teaching materials.

2.4.2. Teaching Evaluation

The teaching evaluation is influenced by the curriculum objectives, contents and teaching methods, and provides the basis for the adjustment of teaching objectives, the optimization of teaching contents and the improvement of teaching methods[5]. The teaching evaluation module of

the system includes student evaluation, peer supervision, expert evaluation, social participation, etc. It evaluates students' learning effectiveness, teachers' teaching level, teaching material quality, teaching process specification and other aspects.

In order to avoid the evaluators only paying attention to the summative evaluation and ignoring the drawbacks of the process evaluation, the systematic teaching evaluation module comprehensively presents all the process materials and data, so as to facilitate the evaluators to diagnose the whole process of curriculum construction and teacher teaching.

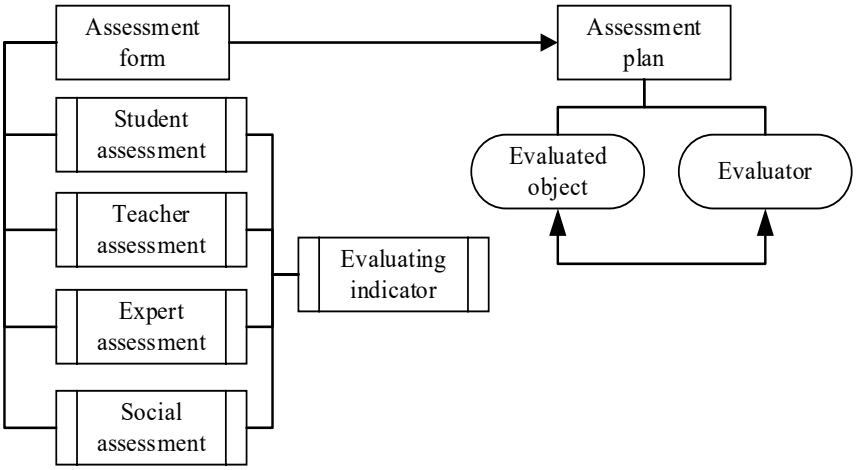

Figure 4 Teaching evaluation process.

3. Achievement of Course Objectives

An effective curriculum goal should be "a statement of students' observable behavior, which can be used as evidence of knowledge, ability and attitude acquired by students in course learning"[6]. The system starts from the observable and measurable curriculum objectives, and builds a model based on the system process and accumulated large amounts of data. The system automatically calculates the degree of achievement of curriculum objectives according to the model to reduce the workload of teachers.

When establishing the model, two factors should be considered to highlight the results orientation: one is the curriculum objectives set by teachers, and the other is the learning effect of students. The curriculum goal is to take teachers as the main body, and mainly investigate whether the teaching content set up in the curriculum meets the professional needs. The learning effect is to judge what students "know" and "can do" after finishing the course from the perspective of students.

The evaluation of curriculum teaching objectives can help teachers measure whether their curriculum content has met the requirements of national standards, and can be used to further improve the quality of content construction. Learning effect evaluation helps teachers master students' learning gains. Teachers can determine teaching priorities according to the results, make up for deficiencies, and choose appropriate teaching methods. Learning effectiveness evaluation helps schools to better establish the relationship between learning and teaching, and students can clarify teachers' expectations, so that they can carry out more targeted learning.

In fact, different teachers have different understandings of the learning effect and the connotation of the curriculum objectives, and many scholars have different understandings of the degree of achievement of the curriculum objectives. Whether the model established by the system based on knowledge, ability and quality truly and effectively reflects the achievement of the objectives, especially to measure whether the implicit objectives are achieved, the model needs to be constantly improved, and also needs more data support.

3.1. Establish a Goal Achievement Calculation Model

Table 2 Calculation model of goal achievement.2

Items Objectives	Goal 1		Goal 2		Goal 3	
	target value	weight	target value	weight	target value	weight
Attendance	T_{0101}	W_{0101}	T_{0102}	W_{0102}	T_{0103}	W_{0103}
Participation	T_{0201}	W_{0201}	T_{0202}	W_{0202}	T_{0203}	W_{0203}
Assignment	T_{0401}	W_{0401}	T_{0402}	W_{0402}	T_{0403}	W_{0403}
Quiz	T_{0501}	W_{0501}	T_{0502}	W_{0502}	T_{0503}	W_{0503}
Mid term examination	T_{0601}	W_{0601}	T_{0602}	W_{0602}	T_{0603}	W_{0603}
Final examination	T_{0701}	W_{0701}	T_{0702}	W_{0702}	T_{0703}	W_{0703}
Experimental training	T_{0801}	W_{0801}	T_{0802}	W_{0802}	T_{0803}	W_{0803}
Works Design	T_{0901}	W_{0901}	T_{0902}	W_{0902}	T_{0903}	W_{0903}
Student evaluation	T_{1001}	W_{1001}	T_{1002}	W_{1002}	T_{1003}	W_{1003}
Supervision evaluation	T_{1101}	W_{1101}	T_{1102}	W_{1102}	T_{1103}	W_{1103}
Expert evaluation	T_{1201}	W_{1201}	T_{1202}	W_{1202}	T_{1203}	W_{1203}
Social evaluation	T_{1301}	W_{1301}	T_{1302}	W_{1302}	T_{1303}	W_{1303}

Constraints:

$$\sum W_{ij} = 1 \quad (1)$$

$$T_{ij} \leqq 100 \quad (2)$$

$$\text{Achieving degree of course objective } N=(\sum T_{iN} * W_{iN})/\sum W_{iN}, (i = 01,02,03\ldots) \quad (3)$$

$$\text{Achievement degree of evaluation item } M=(\sum T_{Mj} * W_{Mj})/\sum W_{Mj}, (j = 01,02,03\ldots) \quad (4)$$

$$\text{Achievement of overall course objectives}=\sum T_{ij} * W_{ij}, (i,j = 01,02,03\ldots) \quad (5)$$

100 points for the achievement degree is the full score. According to the actual situation, the achievement degree $\geq$ 65 can be regarded as basically qualified.

3.1.1. Module Design

The system module is based on the data of each project in the teaching process, and the weight is set by the course leader or professional leader to comprehensively, comprehensively and scientifically evaluate the achievement of the course objectives.

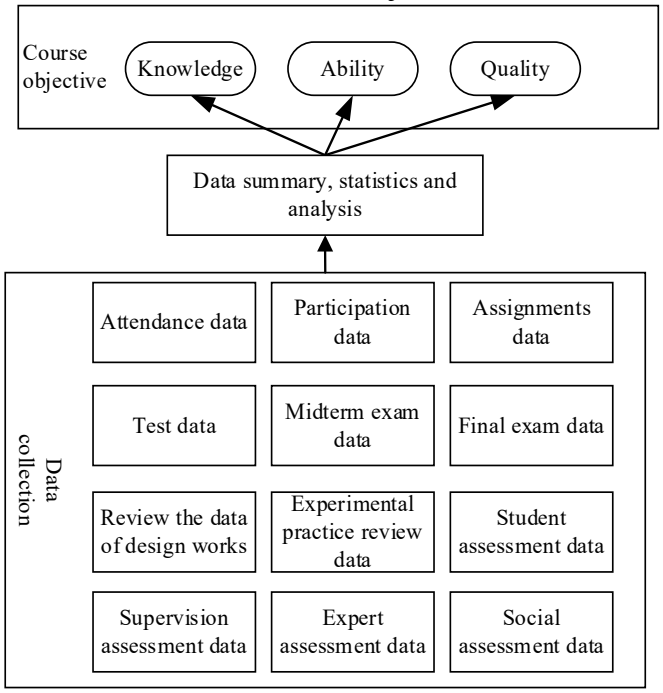

Figure 5 Calculation process of pourse goal achievement.

4. System core Function Design

As the system is closely related to the school's educational administration management system, human resource management system and student management system, in order to reduce the maintenance burden and ensure data consistency, a data exchange layer is set up to exchange data regularly between systems. The data storage layer is used to store the data to be exchanged, the business layer realizes various management functions, and the data statistics and analysis layer realizes data archiving, evaluation feedback report, evaluation inspection, etc.

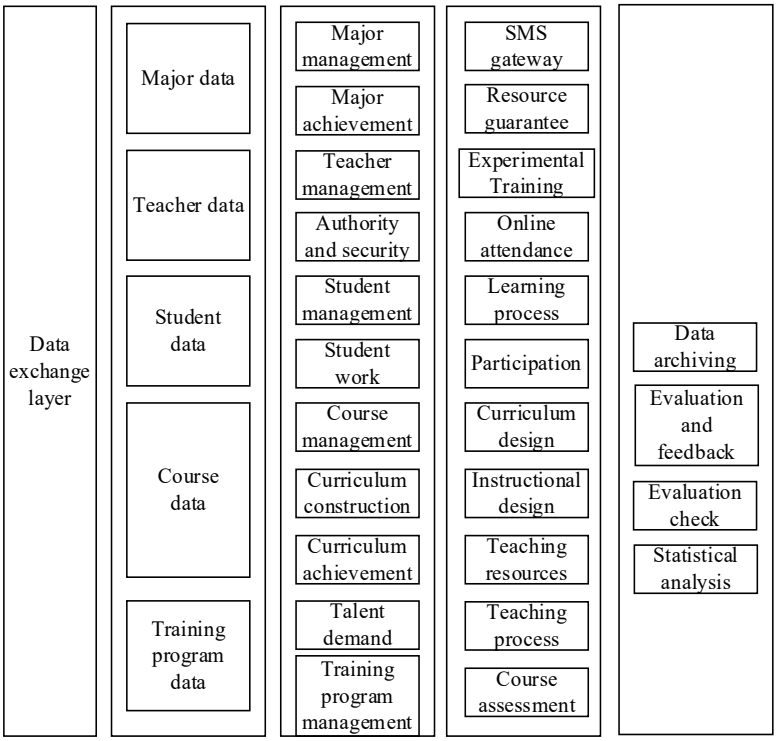

Figure 6 Core function modules of the system.

5. Summary

The quality control system of curriculum construction takes curriculum construction and teaching operation process monitoring as the core, combines the requirements of national standards and industrial development needs on talent training specifications, and is positioned to be the process quality control of applied talent training. With talent training objectives, training programs, training plans, teaching operations, process inspection, effect feedback, and continuous improvement as the main line, it establishes social needs, training objectives, training programs, training activities The whole process information recording, association and management of the training process and training results can realize the whole process trace and traceability.

The system has established the talent training process and the quality monitoring of the course quality construction. Centering on the analysis of adaptability, support, realization, achievement and satisfaction, driven by problem identification, change identification and intelligent feedback, it has promoted the dynamic adjustment of the training objectives, training programs, training activities and training process, completed the closed loop of teaching organization and command, the closed loop of teaching operation guarantee and the closed loop of teaching quality improvement, and realized the informatization The whole process of monitoring, diversified feedback and continuous improvement of talent training quality assurance pattern have realized PDCA cycle of talent training quality control.

References

[1] Bie Dunrong,On the Connotative Development of Colleges and Universities [J]. China Higher

Education Research, 2016, (05): 28-33.DOI:10.16298/j.cnki.1004-3667.2016.05.08.

[2] Mao Yuan, Zhou Qunying. The Construction of Applied Undergraduate Courses from the Perspective of University Classification [J]. China University Teaching, 2009, (03): 4-7.

[3] Wang Yongquan,Analysis and Interpretation of the "bottom line" Problem in The Certification of Engineering Education -- Starting from The Evaluation of The Achievement of Curriculum Objectives [J]. Research on Higher Engineering Education, 2022, (05): 50-56.

[4] Zhu Yingting,Applying Total Quality Management to Improve Teaching Quality [J]. Journal of Liaoning Institute of Education Administration, 2009, 26 (02): 11+13.

[5] Wang Xiwang, Chen Bo. On "Classroom Revolution" in Newly Built Undergraduate Colleges [J]. Journal of Hebei University (Philosophy and Social Sciences Edition), 2022,47 (03): 121-128.

[6] FELDER R M,BRENT R.Designing and Teaching Courses to Satisfy the ABET Engineering Criteria[J].Journal of Engineering Education,2003,92(1):7-2.