



Design and Application of Teaching Quality Platform in Normal Undergraduate Universities

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Abstract. Guangxi Science and Technology Normal University was founded in 2015, and will be conducted the first undergraduate qualification evaluation since 2023. Among them, the level of teaching quality monitoring and evaluation is of great significance to the evaluation of undergraduate qualification. At present, although the college also uses the information platform, but this platform depends on a certain sub-function of the educational affairs system of the teaching affairs Office, and most of the time the quality monitoring and evaluation are still in the “paper version” stage. Although there are 68 information systems in all departments of the university, they basically become “islands” of information, which cannot be shared with each other. Every time each department needs materials from other departments, they cannot be independently implemented in a certain system or platform. Therefore, the school needs to establish a teaching quality platform dedicated to breaking the information “islands” of information, and realize the sharing of information platforms among all departments with school-enterprise cooperation by brainstorming and Delphi method, and finally realize the dynamic and information management of quality control.

Keywords: Quality control · information island · qualification assessment · information

1 Introduction

Colleges and universities should take moral education as the fundamental task, improve the education mechanism, and comprehensively enhance the ability of cultivating talents [1]. In order to achieve the goal of professional talent training, colleges and universities need a teaching quality monitoring system to supervise and evaluate the whole teaching process to achieve the teaching goal. For the fundamental task of “what people to train and how to train people” in colleges and universities, if the training goal can be achieved scientifically with high quality, colleges and universities should establish a teaching quality monitoring system to evaluate the teaching quality accordingly [2]. Guangxi Science and Technology Normal University was promoted in 2015 and will participate in the undergraduate teaching qualification assessment in 2023. In the undergraduate teaching qualification evaluation and audit evaluation system, the teaching quality monitoring

is also an important evaluation index and the main observation point. If this work is completed more effectively, the college will urgently need the support of information platform.

2 Construction of the Information Platform for Teaching Quality Monitoring

2.1 Top-Level Design

Teaching quality monitoring platform runs with the related teaching quality of comprehensive, the whole process, all the information data by collection, evaluation, supervision, and the establishment of the feedback mechanism. The elements of education teaching quality will be analyzed by intelligent big data. The whole process of teaching quality supervision information service services university leadership, teaching management and staff, forming a set of scientific and reasonable, effective teaching quality assurance and monitoring system, realizing quantitative precision, normal sustained, comprehensive coverage, real-time dynamic of teaching comprehensive quality evaluation [3]. Finally, the colleges forms the spiral closed loop of the teaching quality. The overall structure of the teaching quality assurance system is established (See Fig. 1).

The architectural diagram can be divided into four parts. The first part is the overall organizational structure of the college (See Fig. 2):

The second part is the “quality standard” in the middle (See Fig. 3):

The third part is the whole process of the school’s talent training (See Fig. 4):

The fourth part is the process of school teaching operation (See Fig. 5):

These four parts are not separate, but interrelated. All the institutions of the school are placed in this part, which means that all the departments of the school are fully involved in the talent training process. The top part of the organization bears the top-level design and decision-making role, which is also the starting point and end point of quality standards. That is to say, with the top institutions for the school quality standards

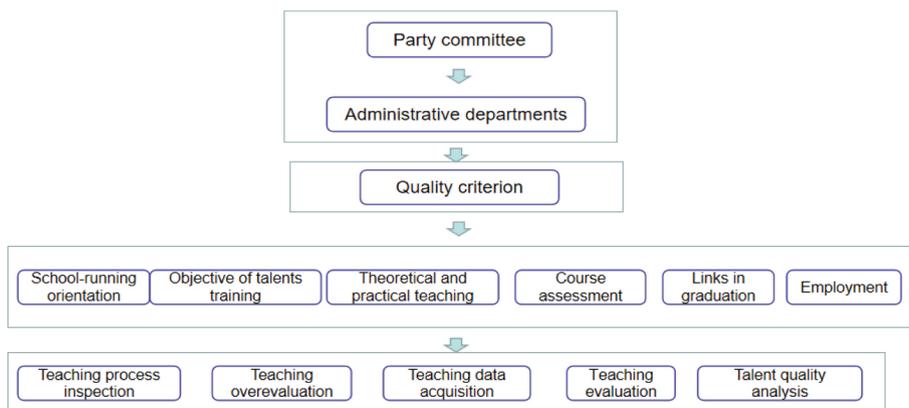


Fig. 1. The overall structure of the teaching quality assurance system



Fig. 2. The overall organizational structure of the college

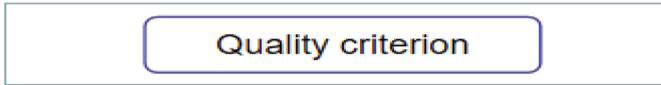


Fig. 3. Quality standard

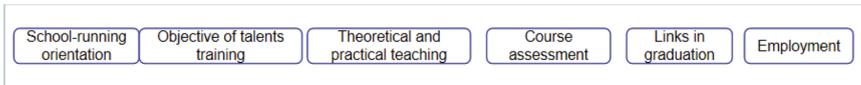


Fig. 4. The whole process of the school's talent training

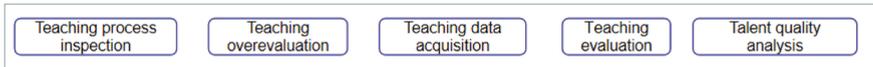


Fig. 5. The process of school teaching operation

after actual operation, the process evaluation the adjustment of quality standards will be back to the top. Then the top improves the quality standards. This creates a big cycle of top-level design [4].

Under the guidance of quality standards, the school carries out talent training activities. The process of school talent training needs external input as the general goal and policy, which is the need of the local economy and society and the country for school talents. The cycle of the talent training process covers demand, school-running orientation (target setting), talent training program, education and teaching process, assessment, students' graduation and employment (a greater assessment), satisfaction evaluation (country, society, parents, employers), which is a cycle of the talent training process.

The teaching part in the process of talent training can form the small cycle of the teaching process in the fourth part, which is the process of the implementation, analysis, evaluation and improvement of the talent training program.

The college uses including big data, cloud computing, mobile Internet and artificial intelligence and other modern IT technology, and establishes a cover education teaching at all levels, the elements, each link of the panorama, comprehensive, and the whole process of data feedback system. The college enhances the level of talent training with great value by the school real-time and global control for the teaching quality.

The above three cycles, the length of the cycle decreases in order. Since the top quality standard cycle and the whole process of talent training is at least a year or even many years of cycle, teaching cycle may be weeks or months. Therefore, on the basis of big data teaching quality monitoring platform project, we focus on the teaching process of cycle, but to the top-level design for input, the output will provide decision reference for the top-level design.

2.2 Application of Big Data

In the era of big data, the efficiency and quality of teaching operation can be greatly improved by the comprehensive data collection, mining and analysis of various factors affecting teaching quality [5].

Since the teaching quality assurance system involves school planning, school-running orientation, training program, teachers 'teaching, students' learning, leadership decision-making, resource scheduling, logistics support, financial support and other aspects, we select the main data involved in the implementation process of teaching quality for construction, including:

- (1) Basic school data
- (2) Teaching operation monitoring
- (3) Professional construction
- (4) Teacher development
- (5) Students grow up
- (6) Resource guarantee

For the above data, we will establish a set of data index system to comprehensively monitor the teaching operation process.

The design of the index system fully refers to the design mode of the first level index / second level index / main observation points of the national undergraduate teaching evaluation, and the quality management platform constructed in this way can also be used for undergraduate qualification evaluation and other work of other types of quality evaluation and professional appraisal.

There are two cases of the corresponding index system:

- (1) Corresponding data in the school's business system or data center.

For this part of the data, the data is regularly extracted from the business system or the data center through the form of open interface, and correspondingly transformed according to the requirements of the quality platform to become the data available in the quality system;

- (2) Data that cannot be found in the existing system.

For this part of the data, we use the process configuration capability of information platform to configure the data acquisition process in a zero-code mode. After the data is manually imported or imported in batches, it enters the database of the quality platform through a certain approval process and becomes a part of the data market of the quality platform.

After data collection, cleaning and transformation, a series of visual data analysis and mining forms are formed according to the established data calculation rules and statistical analysis models, for the use of school management, teachers and business departments, and the basis for the improvement of teaching quality.

The ultimate goal of the teaching quality monitoring platform is to improve the teaching quality, rather than just showing the data. Therefore, it is also necessary to develop a “project management system for teaching quality improvement”, following the idea of PDCA, and forming a closed loop of quality planning, process control, quality evaluation and continuous improvement of teaching quality improvement projects.

2.3 Breakdown of Platform Tasks

The construction process needs to be overall planned, implemented step by step, and gradually promoted and expanded after the formation of phased and local results. Therefore, in the first phase of the construction, we divided the platform construction into the following tasks:

This part of the work is to establish an information platform and design, and realize the completion of the “shared service centre” teaching quality monitoring system. This platform has complete data management capabilities, application development capabilities and integrated opening capabilities. It provides WEB application interface, mobile application interface, multidimensional report interface design tools and zero-code platform to realize the online configuration, release and management of data and process services. The specific tasks are as follows:

- (1) Complete the school business system research, basic data sorting, and data analysis;
- (2) Complete the governance of four types of core master data: basic information of the school, school organization, basic information of students and basic information of teaching staff; establish the metadata system of core master data and reference code specification; identify the data sources and the responsible departments; clarify the relationship between power and responsibility; we define the data care department and personnel corresponding to the master data model, transforming the data care system into the data care mechanism in the platform. Responsible departments and personnel who display data subcategories or data sheet care, form a data care matrix, That is, by means of claim or assignment, we clarify the power and responsibility of data care, form the data production, use, care, modify the power and responsibility distribution matrix. Which departments produce, manage, and manage the data subclasses, also indicates which departments are using them.
- (3) Provide big data fusion integration tools. Cleaning integration college has been built and to build the main data application system data, create and control the master data cleaning in the process of data exchange model, optimize scheduling integration exchange model, real-time monitoring integrated exchange model status, effective cleaning integration heterogeneous system of the underlying data, and realize the data flow and sharing.
- (4) Master data collection and filling, analyze the current data status of the integrated system of the school, target the missing core master data, and quickly build the data collection and filling business services according to the school information standards

and actual business process requirements, so as to provide accurate and complete basic data for the teaching quality monitoring platform.

2.4 Establish a Data Index System

Using big data technology to conduct teaching quality monitoring and management, a very important basic work is to establish a data index system. This index system is set according to the undergraduate teaching qualification evaluation system. For example, the qualified rate of students' physical fitness reaches 85%, the rate of experiment opening reaches 90% of the teaching syllabus, and the counselors are configured according to 1:200 students and so on. The level, dimension, specific meaning, calculation rules and counting method of each data index are defined through the information platform.

Use the information platform to establish the statistical analysis and calculation model of data indicators. These models can be arbitrarily modified and applied in the platform to meet the needs of different periods in the school. We define data index properties and flexibly configure statistical calculation methods.

The data index system is an indicator to measure the teaching quality. As an indicator, the data cannot play a sufficient role without binding to the corresponding calculation and analysis model. For example, the ratio of students to teachers is the result of division between the number of students and the number of teachers, and the number of students is a statistic. According to the rules of the Ministry of Education, the college needs to convert all kinds of students. Data such as continuing education, students of different study periods and international students need to be converted. Special treatment should also be given to students who are suspended from school, drop out or join the army.

3 Display of System Results

According to the index setting of qualified assessment, this system can show three functions. The first one is that if the teaching operation index is abnormal, it will get similar Figs. 6 and 7. The second, school-level managers can view the corresponding trend chart or data according to the teaching operation, and conduct teaching analysis or decision analysis like Fig. 8; The third is a list of teachers or students according to the needs of each department, as shown in Fig. 9.

4 Sum Up

After the design and conception, we finally form a "sharing platform". The advantage of this platform is that data from separate platforms of various departments within the school can flow into this shared platform. The platform uses data governance to get the data that the users need. For instance, if a department needs data from other departments, you can set the spreadsheet fields according to your requirements on your own office as shown in Fig. 6, and then generate the required spreadsheet by yourself. Also there are other teaching administrators who can see from the corresponding columns of the system to monitor the current teaching operation as shown in Figs. 7 and 8. If teachers want to know about their own research, they used to go to the scientific research Office;

SEQUENCE	INDICATOR No.	INDICATOR NAME	ALTERNATE FIELD II	MEASURE UNIT	ALTERNATE FIELD I	GUIDELINES	OPERATION
01	ZY044	STUDENT SIZE					
02	ZY043	PRIMARY EMPLOYMENT RATE OF GRADUATES		%			
03	ZY042	DOUBLE CERTIFICATE RATE OF GRADUATES		%			
04	ZY041			%			
05	ZY040			%			
06	ZY039			%			
07	ZY038			%			
08	ZY037						
09	ZY036						
10	ZY035						

Fig. 6. A data index system

Date	Academic Year	Term	College Number	College Name	Index Number	Index Name	Actual Value	Standard Value
2022-06-20	2022	Second semester	10011	Mathematics and Computer Science	1200230023	Log submission	85.34%	100%
2022-06-21	2022	Second semester	10011	Mathematics and Computer Science	1200230023	Log submission	90.35%	100%
2022-06-22	2022	Second semester	10011	Mathematics and Computer Science	1200230023	Log submission	93.44%	100%
2022-06-23	2022	Second semester	10011	Mathematics and Computer Science	1200230023	Log submission	95.44%	100%

Fig. 7. The warning information of teaching log

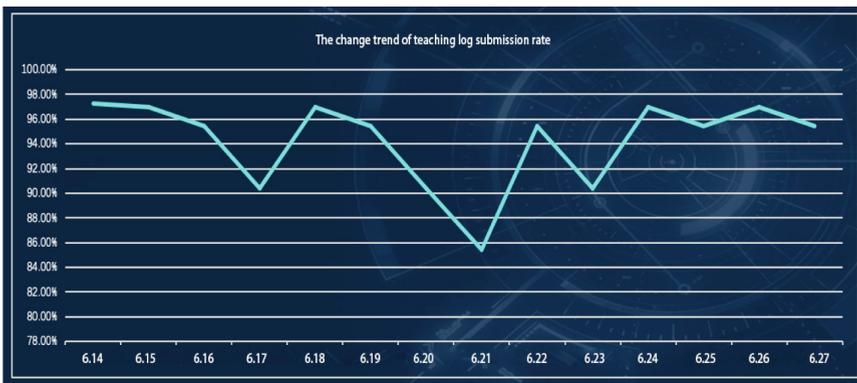


Fig. 8. The change trend of teaching log submission rate

To know their own schedule, they have to open the teaching affairs system; To know their assets, they have to check in the state assets department; To know the meal card and salary situation, they used to inquire the finance department. Now Fig. 9 can be a

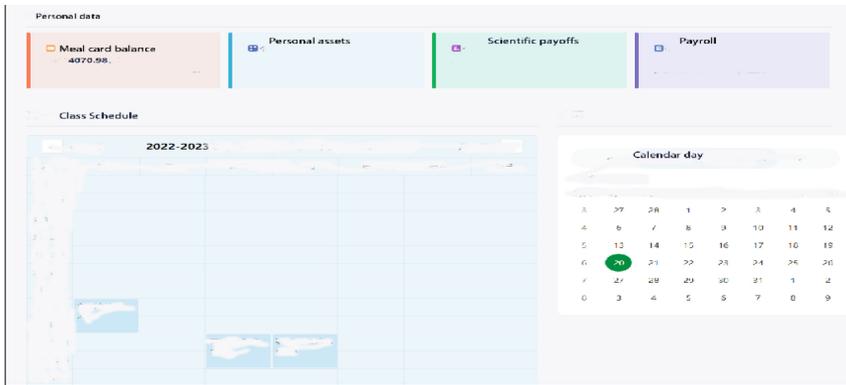


Fig. 9. A list of teachers

solution. Although the concept of this system has been completed, the security of data is safe or not after operation. We still need to check later.

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