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Researches and application of basic education state database of regular colleges and universities

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ABSTRACT

The establishment of national basic education state database of regular colleges and universities is the inevitable tendency of social development and is an important reformation of education supervision and performance evaluation. This paper introduces the development history, database structure and the functions of the national basic education state database of regular colleges and universities, and analyzes the development of education database in the United States as well as the application of basic education state database in China.

KEYWORDS

Regular colleges and universities; Basic education state; Database; Education supervision.

INTRODUCTION

With development of economy and society, the total number of colleges and universities keeps increasing year on year and their enrollment scales keep expanding continuously, attracting increasing attentions on education quality[1]. In order to ensure the education quality, the state government has to enhance management and guidance over the basic education states in colleges and universities, in order to develop timely knowledge of the basic education states in colleges and universities. For such purpose and in order to improve the efficiency in education evaluations in colleges and universities and to secure the principles of justice, fairness and open opportunities, the Ministry of Education began to build its national basic education state database system since the end of 2007[2]. The establishment of basic education state database will play important roles in the education quality monitoring and control, college and university management as well as higher education quality by the Ministry of Education[3]. This paper introduces the development history of basic education state database, its functions and data content as well as the development of basic education state database in foreign countries, in order to shed a light on the enormous roles of basic education state database in monitoring and management of colleges and universities by the Ministry of Education.

DEVELOPMENT HISTORY OF BASIC EDUCATION STATE DATABASE

The most extensively used database system earlier in China took shape from the *Basic Statistics Forms of Higher Education*, which were prepared regularly by all colleges and universities and then summarized and submitted by the Department of Education to the Ministry of Education, on basis of which analysis on related situations in colleges and universities was made. However, such database system mainly provides statistical functions and cannot provide any information of the teaching staff and students; information transparency and data sharing are hard to realize. Besides, the database did not provide basic state information of colleges and universities, resulting in lack of information for performance evaluations of universities. As shown in TABLE 1, China began to build its basic education state database in 1994, and the State Education Commission proposed the requirement on statistics of education states in various colleges and universities, so that Chinese scholars began to fix their attentions on this database and carried out a series of researches. In 1998, the Ministry of Education issued related documents, requiring establishment of the evaluation information system for colleges and universities, in order to realize macro-control and evaluation on education quality in colleges and universities. In 2006, a stand-alone university education state database was developed and applied among all universities in China. In 2007, the Ministry of Education approved the project of national basic education state database, and many universities, such as Sun Yat-sen University and Beijing Normal University as well as the evaluation center of the Ministry of Education launched a series of researches and application of this project and had worked out research plans. The researches fell in three states, including investigation and design, development and improvement and official application. From early 2007 to early 2009, the project team began the investigations and design and proposed a database indicator system. Pilot tests were done in over ten universities, to simulate the top-level design place of the education state database. From early 2009 to early 2011, the project team made improvements to the researches and preliminarily mapped out related systems and launched pilot tests in more than 20 universities throughout China and carried out evaluations and investigations into over 20 newly established universities. In March 2011, the basic education state database system was officially put in operation and data from 173 colleges and universities were collected and input to the system. In 2012, data collection was made in 270 colleges and universities throughout China [4]. The establishment of national basic education state database promoted development of higher education and education quality in colleges and universities, therefore, it is an important part in the quality monitoring and evaluation by the Ministry of Education over all colleges and universities in China.

STRUCTURE AND FUNCTIONS OF BASIC EDUCATION STATE DATABASE

Structure of Basic Education State Database

1. Inherent structure of basic education state database

Data items make the inherent structure of the basic education state database, but data items have to follow the principles of scientificity, systematicness, operability and guidance, which are the design conceptions of such basic education state database, as show in Figure 1.
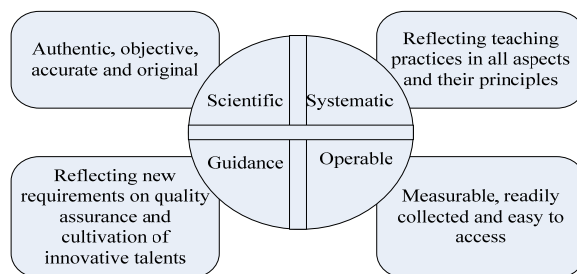

Figure 1 : Content design conception of basic education state database

TABLE 1 : Development history of basic education state database

Year	Content
Yr. 1994	The former State Education Commission issued *Notice of Issuance of Opinions on Enhancing Teaching Practice in Regular Higher Education Institutions*, pointing out that it is necessary to carry out data statistics and announcement on basis of higher education institutions, in order to understand the operating state of teaching practices in colleges and universities in China.
Yr. 1998	The Ministry of Education issued Opinions on Further Improvement of Teaching Practice Evaluation if Regular Higher Education Institutions, which pointed out that a teaching practice evaluation information system is to be built, in order to establish a macro-control and evaluation system that fully caters to situations in China.
Yr. 2006	The Ministry of Education entrusted related R&D institution and developed a stand-alone education state database for universities, which, with approvals from the National Bureau of Statistics, carries out data statistics over all universities in China.
Yr. 2007	The Ministry of Education approved the project of national basic education state database system, in accordance with *Opinions of Ministry of Education and Ministry of Finance on Implementation of University Education Quality and Teaching Practice Reformation*, in order to enhance the macro-control over higher education institutions and to understand the basic education states in colleges and universities.
February 2008	The design plan seminar for national basic education state database system project was held in Guangzhou.
Early 2007 to early 2009	Investigations and designs for the national basic education state database system project were launched and the research team proposed a database indicator system through in-depth study.
Early 2009 to early 2011	The national basic education state database system project was developed and improved. The indicator content, tiers and structure as well as system functions of such database were preliminarily determined and a number of systems were developed for the basic education state database, covering data collection, education evaluation management, data exploration and analysis systems.
March 2011	The basic education state database was included in *Opinions of Ministry of Education on Undergraduate Teaching Practice in Regular Higher Education Institutions* (JG [2011] No. 9).
Yr. 2012	The basic education state database was included in *Opinions of Ministry of Education on Comprehensive Improvement of Education Quality in Higher Education Institutions* (JG [2012] No. 4), which made the basic education state database a components of the higher education quality guarantee systems.

(1) Principle of scientificity means that the database must ensure the data collected are authentic, objective, accurate and original. Derived data should be generated by the database system after information collection and should not be calculated in advance and then the derived data are directly collected.

(2) Principle of systematicness means that the basic education states in colleges and universities should be treated as an entire system, of which the relationship between various parts are coordinated, to ensure the integrity and balance of data. The data collected should cover all-round information, including education environment, conditions and states.

(3) Principle of operability means that when the database collects data, it must ensure the data collected are measurable and can be readily collected and easily accessed, in order to ensure the operability of data collection. Work load of data collection should be reasonably scheduled and shared by the Ministry of Education with colleges and universities.

(4) Principle of guidance means that the data collected by the database should reflect the basic education situations, characteristics and requirements of the higher education institution, in order to provide guidance on the correct direction of evaluations by Ministry of Education on education practices.

On basis of the basic education states, the data cover 7 aspects, as shown in Figure 2. During the submission of data, the data should be classified into 11 categories, in 97 forms on basis of the organization and management system settings in the university, as shown in Figure 3. 8 forms should reflect the basic information of the concerned university, including main hardware conditions and supporting facilities in such university. 8 forms should reflect the teaching staff information, mainly including basic information of university leaders, qualifications of teaching staff, information of part-time teachers, senior talents, basic information of teachers in various colleges and departments and their personal promotion programs, communications, basic information of technical personnel in fundamental laboratory as well as experiment technical personnel in various colleges and departments. 42 forms should reflect the education and teaching practices, mainly including specialty settings, course arrangements, teaching practices, course construction, teaching staff, courses and teaching effect, etc. 5 forms should reflect the investments in teaching practices, including teaching investments. 2 forms should reflect the devices and instruments for scientific researches, mainly including all fixed assets of university and scientific research equipment and precision instruments held respectively by departments. 5 forms should reflect the teaching conditions, including administration building, teaching facilities, books, journals and dormitories. 14 forms should reflect the basic information of students, mainly including Students' Union, enrollment, graduate employment, scholarship, loans, basic information of undergraduates and graduates. 3 forms should reflect after-class activities of students, mainly including student organizations and societies, lectures, occupational qualification trainings and quality training bases. 3 forms should

reflect the scientific researches, mainly including scientific achievements and essays published and other matters that can embody the qualifications of the teaching staff. 4 forms should reflect the discipline construction, mainly including key disciplines and achievements made as well as other things that can embody the academic competence. 3 forms should reflect other information, including other information beyond those given above as well as some special notes.
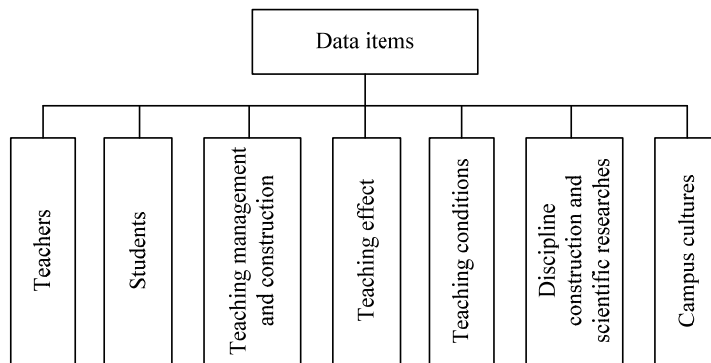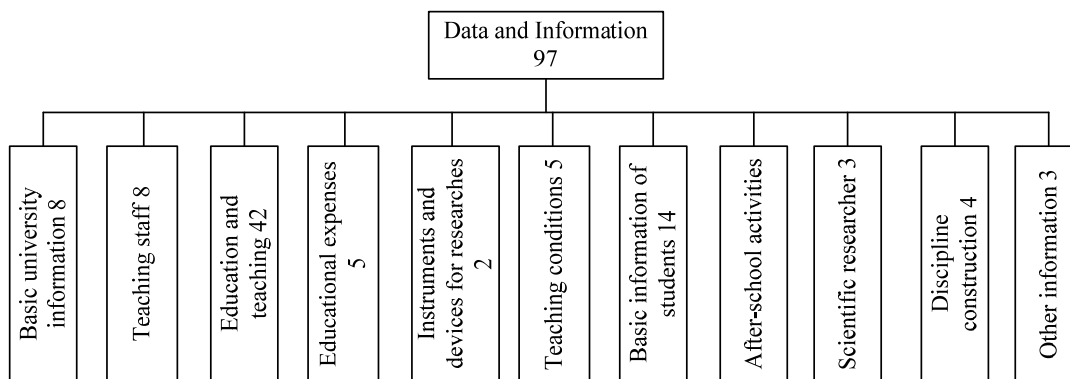
Figure 2 : Content covered by data items

Figure 3 : Data and information classification and distribution

Tiers and structure of basic education state database

The basic education state database is primarily composed of four tiers, namely basic data tier, state data tier, indicator data tier and comprehensive indicator tier. The basic data tier mainly includes organizational structure, teacher library, student library, specialized course library, teaching conditions library and study archive library and is mainly managed by the university. The state data tier includes featured data, evaluation data, state body data, and statistic data and is managed jointly by the university and national organizations. The indicator data tier mainly include information with respect to scales, development, structures, levels and subjective quantized information and is managed jointly by the university and national organizations. The comprehensive indicator tier includes investments, environment, process and effect and is managed by uniformly national organizations. The university should carry out data analysis and monitoring and controls over subordinate colleges and departments. Besides, the university should report the basic information, evaluation reports and quality reports to related national organizations, for purposes of analysis, evaluation and monitoring.

Functions of basic education state database

The main functions of basic education state database is to serve the governments, university, society as well as teaching evaluation and quality supervision. The basic education state database mainly functions as an information source for the university and the general public, and should be undated on a yearly basis. It should precisely include the education states of the university, in order to carry out targeted arrangements. The database should provide self-diagnosis functions to improve the disadvantages in teaching practice. Besides, the database should be connected to related management information systems for sharing of resources. It should also reflect the basic operating conditions and teaching conditions and embody the education conception of the university. The basic education state database should service the university, competent education departments and the society, therefore it also undertakes corresponding responsibilities, as shown in Figure 4. The higher education institutions should complete the latest information, so that the state organizations have real-time knowledge of the conditions in the university and the university should carry out independent evaluations and management. The education supervision authorities should exert evaluations and monitoring over universities and understand the basic information of a university by using the data submitted, in order to support related decisions. The general public mainly play an inquiry and supervising function. The functions and relationship with service objects are as shown in Figure

5. It is found from Fig. 6 that the service objects can make use of the basic education state database to collect data, and to realize analysis, management, and decision-making on basis of such data collected. In addition, the service objects can evaluate, decide on and supervise the database.
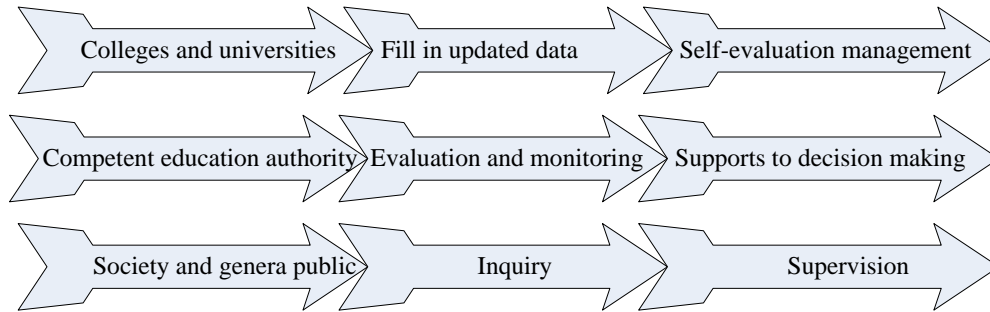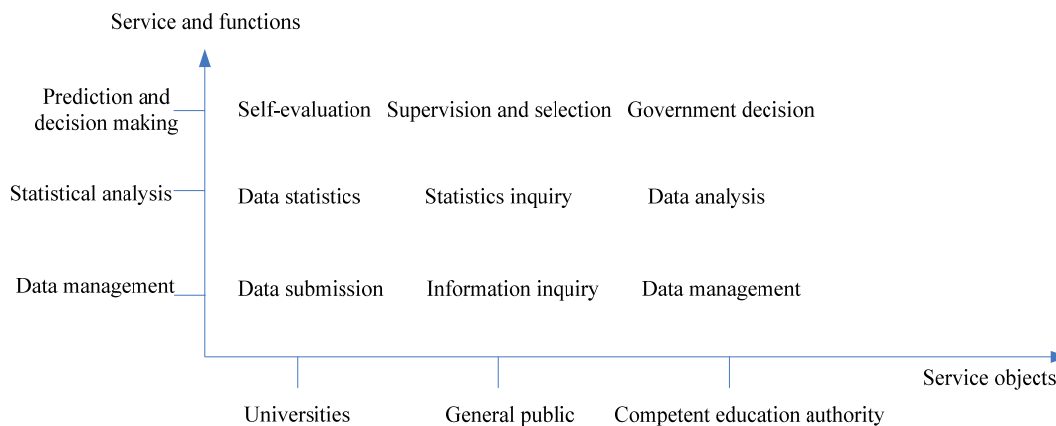

Figure 4 : Basic functions of service objects

Figure 5 : Relations between functions and service objects of the basic education state database

OVERVIEW OF BASIC EDUCATION DATABASE IN OTHER COUNTRIES

With the development of society and technologies, many countries have established their education database and the databases in some developed countries are more inclusive and provide abundant information. A case in point is the higher education database in the United States[5], for it plays very positive roles in national decision making and higher education planning in the US, therefore we should learn from it.

The US higher education database is composed of a number of functions, including: data sharing for cross-university comparison and self-evaluations. An extensive range of data are collected and included in the database so that the decision makers in education departments can make quick and precise analysis and corresponding decisions. The data collected are in diversified forms and most of them are original data, so that it provides researchers with abundant data and information. The general public can enjoy complete university education information, so that better supervision and understanding become possible and the public can select the desired colleges and specialties on basis of such information. As a development country, the US also has internationally leading information technology and extensive application throughout the country, resulting in relatively complete structures and functions of the higher education database. As such, we should learn from the US.

APPLICATION OF BASIC EDUCATION STATE DATABASE

After the national basic education state database project was approved and established in 2007, with researches of dedicated teams and related scholars, the database was finally launched in trial operation in 2009[6] and officially put into operation in March 2011. The establishment of the database has important roles on supervision and evaluations of higher education institutions, especially it provides data basis for development of new colleges and universities. This paper mainly introduces the application of database in data collection of new colleges and universities. In 2011, the Ministry of Education evaluation center carried out data collection of 170 colleges and universities in two batches. In 2012, the Ministry of Education evaluation center carried out data collection of more than 270 junior college- university upgrade programs. In June

2013, the Ministry of Education made use of a subsystem in the database, namely the teaching practice evaluation management information system to launched evaluations over 80 newly established colleges and universities.

CONCLUSIONS

The database has played important roles in education supervision, teaching evaluation and analysis on university information, since the basic education state database was established. It especially played critical roles in the supervision and evaluation by governments over schools. What's more it provides new colleges and universities with self-diagnosis that can help to improve the teaching quality and to regulate its management, to promote the application and development of IT. This paper starts with the development history of the database, introduces the structure and functions of the database and analyzes the functions provided by such database in developed countries like the USA. Besides, it also introduces the application of basic education state database in China in recent years. Through these analysis, it can be concluded that the basic education state database makes significant contributions to the school supervision and evaluations, however in comparison with that in the US, there is still gaps in terms of comprehensiveness of data and sharing. With developments of society and science and technologies and supports from governments, colleges and universities and society, the basic education state database will be improved step by step.

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