# Applied Research of Data Fusion Governance and Sharing System on Education Informatization

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**Abstract.** To solve the difficulties and blocking points in the informatization, such as information silo, overlapping management, repetitive reporting, and groundless decision making, we explored the technical core of process reengineering based on data fusion and probed into and constructed the "governance and sharing system of total factor data fusion."

**Keywords:** Data fusion · education informatization · big data

## 1 Introduction

The acquisition, storage, and application of effective data have always been difficulties in informatization [1–3]. After more than a decade's development of informatization construction, colleges and universities have basically achieved informatization in services of teaching management [4–6]. However, a range of problems arising from data acquisition and applications have become increasingly prominent, including repetitive reporting of various types of data and inconsistencies among those data, scatter storage of faculty information and no connection among those information [7], independently established application system and a large number of information silos, and management decision making based on inaccurate and groundless information [8, 9]. To tackle the difficulties and blocking points in the informatization, such as information silo, overlapping management, repetitive reporting, and groundless decision making, we explored the technical core of process reengineering based on data fusion and probed into and constructed the "governance and sharing system of total factor data fusion."

## 2 System Structure

The system was constructed under the principle of not making a fresh start and not simply pulling down the old one and rebuilding a new one. Its design was based on the compatibility and inheritance of all kinds of original management and business systems (Fig. 1).

Through the unified database on personnel and the unified identity authentication platform, all personnel and their information were unified in all business, management,


V. Balakrishnan et al. (Eds.): ICMEIM 2022, AHSSEH 6, pp. 559–565, 2022.
https://doi.org/10.2991/978-94-6463-044-2_71

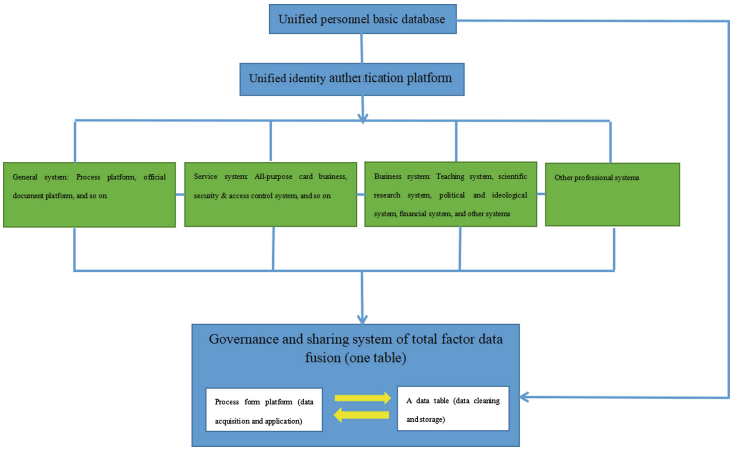


**Fig. 1.** The overall structure of the system (self-drawing)

and service systems. On this basis, the governance and sharing system of total factor data fusion could access all business systems and retrieve relevant data.

The governance and sharing system of total factor data fusion was mainly composed of two parts: The total factor information data table and the process form platform.

## 3 Total Factor Information Data Table

Based on the needs of data acquisition and application collected from all departments, the total factor information data table constructed a total factor information database covering four main categories of personnel of the institution. The database included eight dimensions, 26 subitems, and more than 400 fields ranging from basic information, job information, education and work experience, teaching management, and scientific research. The physical and logic centralization was accomplished by analyzing and stripping off business systems data involved, accompanying collection of relevant data, and aggregating those data via the data interface. Each data was transformed and cleaned in accordance with the sole criterion to ensure its uniqueness. Besides, the authoritative source and management approaches of each data were clear, so that "one source for one data" was achieved.

Faculty members could not only inquire about information about themselves conveniently, but also file an application for updating and verifying information in accordance with the administrative authority of the field.

Relying on the powerful capabilities of the background in statistics, inquiries, and analyses, the system could inquire about, perform statistical analysis on, compare results of, and collect and output any data stored conveniently to satisfy the work needs of a wide range of services of teaching management in the university.

The engine was configured based on the dimension table. In that way, data could be arranged and combined and retrieved and output in any dimensions and any structures as needed. For instance, when a certain department needs to fill out and submit a specific

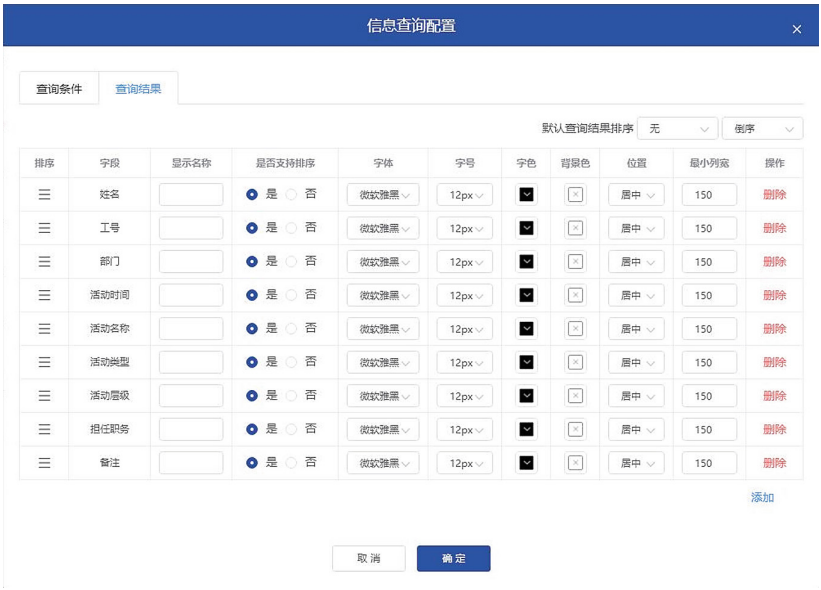


**Fig. 2.** Example of the information query configuration (self-drawing)

statistical table, if none of the fields in that table is included in the repository of the table, a table can be exported directly by combining fields on demand, which dispenses with the need to organize personnel to fill out and submit tables (Fig. 2).

## 4 Process Form Platform

To efficiently apply data, we designed a "process form platform" through which all types of electronic forms could be edited online. Forms that need to be filled out for the purpose of collecting data can be made into electronic forms before relevant information in the total factor data table is automatically filled in the forms. By doing that, "filling out data for once and using it multiple times" was achieved (Fig. 3).

In case of special and discrete data not included in the total factor table, users could fill out and submit the form online by themselves, and the departments concerned would assess the data fields. If those data conform to the requirements of entering the database, they can be transformed and allowed to get into the database by data standards to enrich and refine field data in the table constantly (Fig. 4).

The approval procedure of online forms could be set freely. By means of creating forms and establishing processes, a full workflow containing teaching, scientific research, material procurement, student services, and other business could be managed. Such an approach facilitated the work of all business departments and faculty members on obtaining feedback from information acquisition and managing services.

While promoting efficiencies in working and providing services, the system automatically reorganized results data, which allowed for accurate data analysis of a specific process. As a result, a regular pattern was grasped, and problems were identified,


**Fig. 3.** Interface of process form (self-drawing)


**Fig. 4.** Example of process form (self-drawing)

which would provide scientific and accurate data support for improving work quality and effectiveness.

## 5 Application Effects

After being deployed, the system has collected nearly 100,000 data of all kinds, eliminated 19,000 redundant and wrong data, and provided nearly 100,000 data for supporting more than 20 tasks such as teaching evaluation and academic statistics. The process form platform has made available over 80 processes for filling in various types of data and witnessed over 11,000 times of data reporting, accomplishing the goal of making services more easily available to the teachers and students through more data exchange and sharing. By doing that, teachers and students became highly satisfied with the construction of informatization. Meanwhile, the building of the system directly promoted upgrading or rebuilding of some old systems. That created a strong atmosphere of informatization, enhanced personnel's information-based quality, and thus put informatization into a virtuous cycle (Fig. 5).

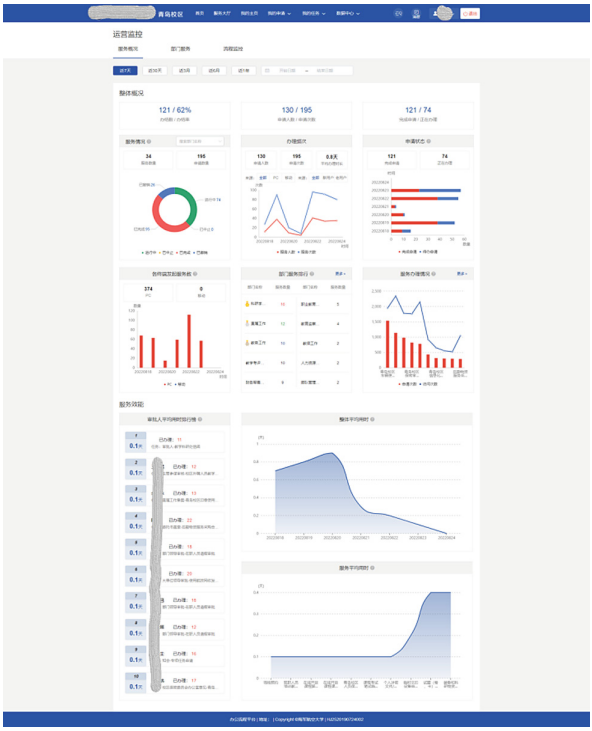

**Fig. 5.** Visual interface of the system running big data (self-drawing)

## 6 Conclusion

Following the demand-led, innovation-driven, opening-up and integration, highlighting characteristics, and intensive and efficient general idea, we should take strengthening the network facilities as the foundation and process reengineering based on data fusion as the technical core, focus on comprehensively boosting business applications, and accelerate the building of a unified online service platform.

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