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The Integrated System Design and Development of Educational Data and Financial Data Based on .NET

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Abstract
NET-based services “integrated data center “credit charge model with the advantage of the combination of BIS three-tier structure and C/S two-tier structure mixed-mode and combination with cross-platform web services technology has been put forward to achieve the sharing and collaboration of data between educational system and financial system .The system has already been put into use in jiangsu University of science and technology because it is efficient and has strong security.

Key words: Credit system; Educational data; Financial data; Integrated data center

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INTRODUCTION
In recent years, with the widespread use of the credit system of university, the credit system reform of charges has come along. But there are some problems on the transition of charges when it is changed from the academic year to the credit system. According to traditional charging method, students pay their tuition only in the beginning of each academic year and there is no disputes between schools and students. But when it comes to credit fees and charges, students may have different types of credit fees due to different elective courses, because the charging method is not transparent so that schools may be put into a situation of charging arbitrarily. In addition, when communicating with students who have different elective courses about their payments information will also encounter problems[1]. At present, the majority of our colleges and universities are implementing improved academic year, such as the academic year with elective courses, academic credit, flexible school system, etc.. However, the only minor changes are made of the traditional charging methods, its essence is still the school year system charges and the credit system is still not implemented completely. Although the credit system is the developing trend of China’s higher education of the new century, we should look for a credit management system to match the management of credit fees and charges to comply with credit requirements of teaching reform.

1. REQUIREMENTS ANALYSIS
At present, the fee model adopted by most Universities is that students begin to elect when the elective system is available.The financial system guides into a one-time student enrollment data and does centralized deductions after confirmed.They use electronic data (Excel, DBF) format or paper format for data exchange between Financial sector and the educational system.Paper documents simply can not be competent when facing such large amounts of data. What’s more ,we need to do a lot of hand-matching work before importing.All of the above is not only time-consuming but also prone to error[2]. Data is likely to convey asymmetric information among the various departments and thus result in inconsistent of students’ basic information. Students enrollment status changes such as suspension of schooling, return to school, drop out, graduate early, extend the school system, will also lead to changes in billing system information.

This charging model exposed obvious shortcomings when it is implemented initiatively. First, elective fees’ opaque. Educational systems have no access to financial database, so students can’t see the fees of their elective

course; Second, enrollment fee is not easy to check. Elective payment data is stored in financial databases, but the confidentiality and security of the financial data made its decision to not allow external network access, so students can only check their elective fees and payment information at the finance department; Third, system security risks. Educational system database opened a channel to the financial system which will have insecurity influences on educational system and financial system.

With the widespread use of credit fee reform, the existing charging system must be upgraded to accommodate the needs of credit charges. In the credit system, both of financial systems and educational systems work independently; the educational system complete the student's academic elective alone, and the financial system completed charges alone. But under the conditions of the financial system, data sharing is required for both systems to complete the charge together. In order to upgrade the existing system, we have two possible solutions: First, developing a new system to meet the need of the credit charges; Second, we can build an integrated data center as a bridge to connect the financial system and the educational system, which is based on the original system, doing data exchange and information share, and thus the two systems can work together. The first scheme is feasible, but the re-development system is not only a waste of old resources but also time-consuming and of high development costs. The second scheme can effectively integrate existing system, make full use of the present resources, reduce development costs and shorten the development time, which is the ideal solution. Since most of the old financial system and educational system are developed independently and bring in technology and platform of software and hardware of different periods, in order to establish two systems' shared data center, we need to address cross-platform, heterogeneous programming language independent, data heterogeneous and other issues. In this paper, we put forward NET-based integration system of educational data and financial data, which is taking full use of cross-platform of Web services technology and is effective integration of existing system resources. By doing this we can get a large reduction in developing costs and shorten the development cycle. At the same time, it is convenient for educational and financial manager to enrollment statistics of curricula-variable and cost management, effectively solving the upgrading issues brought by the reform of the software.

2. SYSTEM DESIGN

The system use the advantage of the combination of B/S three-tier structure and C/S two-tier structure mixed-mode. In the B/S three-tier structure, we mainly design the interface of students' enrollment ,payment and information query. In this way, it provides customers with powerful, flexible and convenient service of enrollment, payment and other ways to search in the client-side, then the results are published in HTML pages; In C/S t two-tier structure, we primarily designed some basic work that is closely related to underlying database system such as system management and data maintenance functions. It has good security[3]. The system architecture is shown in Figure 1.

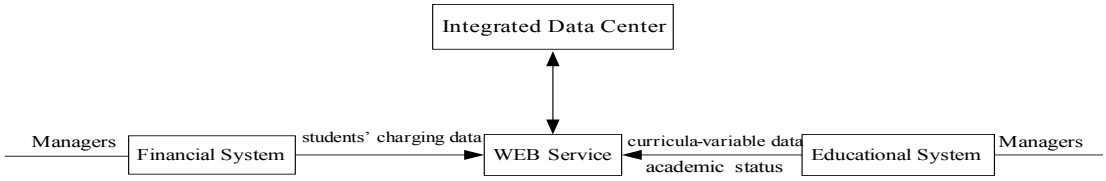

Figure 1
System Structure

In order to make charging more transparent and the checking more convenient, we proposed NET-based "integrated data center" credit fee program to get more efficiency and security. As is seen in Figure 1: financial manager can uploaded the student's payment data by building an integrated data center to integrated data center through Web service. At the same time, the educational manager uploaded real-time elective data to the integrated data center. Thus, through the integrated data center, education staff have access to the latest payment, arrears information and finance staff that also have access to the latest student enrollment data, achieving the data sharing, collaborative work of educational system and financial system[4]. Inside and outside relations are shown in Figure 2.

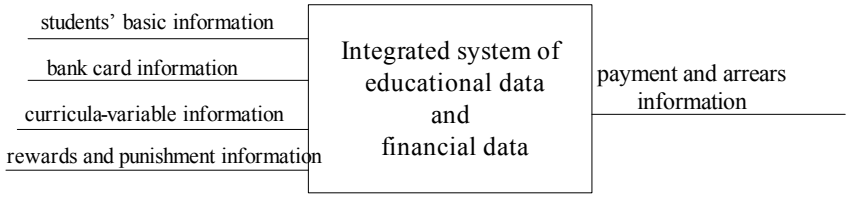

Figure 2
Inside and Outside Relations

3. SYSTEM DESIGN

3.1 System Objective

System target is to establish an integrated system of educational data and financial data by taking full use of the data available, making effective integration of existing systems and reducing development costs time. The integrated system will facilitate students' statistical management and address the upgrade issues effectively brought by the reform of the software from academic year to the credit charges. Online course elective can make fee transparency. Students can check their payment and elective cases online[5].This system to a large extent will facilitate managing students' course selection, registration and arrears information, which is not only time-saving but also efficiency.

3.2 Functional Design

This system is composed of two modules: students' queries management and data management. Students' query management is implemented through the wet pages, including registration and enrollment information, course selection and payment inquiries; Data management is consist of two modules: financial management and educational management, including payment information, course information and registration information management. As shown in Figure 3, student enrollment management is a platform provided for students, through which students can doing registration and enrollment as well as checking their course selection and payment information. In this module, students can query the data on enrollment and, ultimately, all the information can be seen in a complete WEB enrollment form.

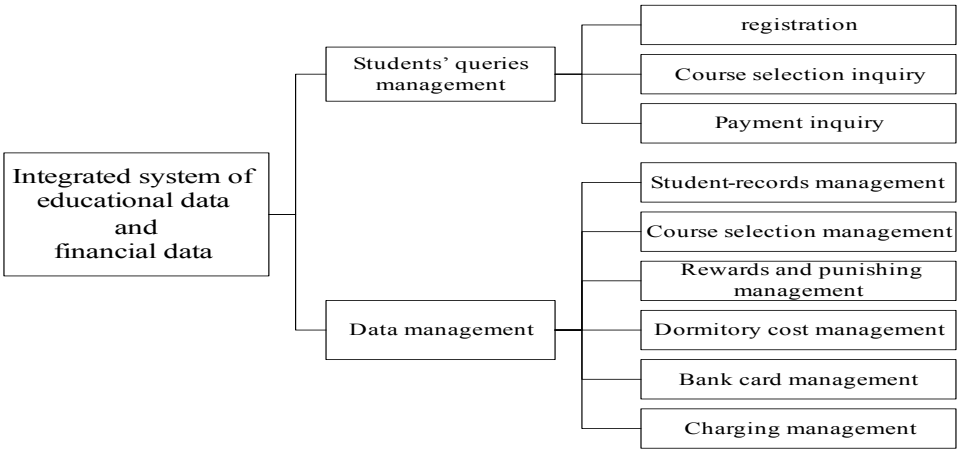

Figure 3
Function Structure Chart

Data management module is used for financial management and administrator to maintain the data. Educational Administration export students' basic information and enrollment information from existing students' educational information system, and then upload the data to the integrated data center, financial manager download the latest enrollment data and enrollment data from the integrated data center, while leading in Scholarship information, accommodation costs and other basic academic and financial data. Financial manager can modify and delete these data and entering students' payments data at real-time , finally they uploaded the payment and arrears data to the integrated data center.

3.3 Database Design

The whole integrated system is essentially operations about a variety of data tables related to course-elective, enrollment and payment. Database plays a very important role in a system, the actual quality of the data structure will directly affect the overall efficiency and the results[6]. Reasonable data structure can improve the efficiency of database storage to ensure data integrity and consistency. According to the system functional, in order to facilitate the management and implementation, we use a library of multi-table, establishing a central database, database tables, including students table, course-elective table, curriculum table, rewards and punishments table, and administrator table, to meet users' data storage and access needs. Five table and their relationship are shown in Figure 4.

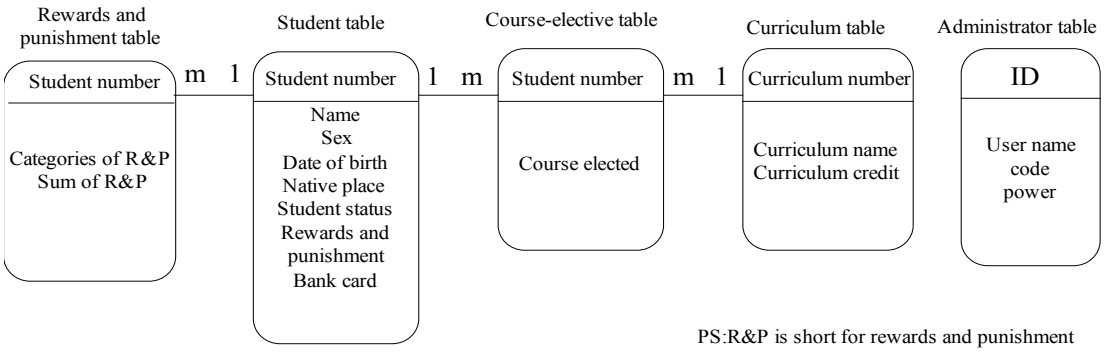

Figure 4
Database in the Integrated System

4. DEMONSTRATION ANALYSIS

There are about 5,000 students in Zhangjiagang campus, Jiangsu University of Science and Technology. Now we implement the credit system, and so is the payment system. But the essence is still the academic year fees, educational systems and financial systems are independent from each other, the two departments exchange data with the help of Excel through LAN. As there is a very large amount of data, and the sharing data is the basis of initial data, statistical analysis is very difficult to educational administrator and finance manager ,which have caused great inconvenience. It takes a lot of time to import and export the electronic data, and we need to do a lot of hand-matching work before importing, not only time-consuming but also prone to error. Data is likely to convey asymmetric information among the various departments and thus result in inconsistent of students' basic information. Students enrollment status changes such as suspension of schooling, return to school, drop out, graduate early, extend the school system, will also lead to changes in billing system information. Much time and manpower will be spent to do All these tasks.

But when the integrated system is successfully implemented, the educational system and the financial system is completely linked. We take full use of the cross-platform advantage of the Web services, and effectively integrated existing resources, getting a large reduction in development costs and cycle. At the same time , it is convenient for educational and financial manager to enrollment statistics of curricula-variable and cost management, solving the upgrading issues effectively brought by the reform of the software. Changing current situation that the information is disordered and incapable-shared. The main window of the educational and financial conversion system is shown in Figure 5.

Card information maintenance, scholarships, exemptions and arrears information maintenance system mainly includes a data maintenance related to teaching plan, bank tenance, clearing tuition of the current year and charged information of next year and achieving the goal of sharing of the academic and financial information. The clearing tuition interface in current semester is shown in Figure 6.

Figure 5
Main System Window

银行卡	教学计划	学分	学分学费	重学学分	重学学费	专业学费	实际学费	学费结算	宿舍
1045511102	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511103	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511104	500	14	-8800	124	9920	-5400	-4280	-8880	124
1045511105	500	24	-8000	124	9920	-5400	-3480	-8080	124
1045511106	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511107	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511108	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511109	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511110	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511111	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511112	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511113	500	8	-9280	124	9920	-5400	-4760	-9360	124
1045511114	500	8	-367360	4600	368000	-5400	-4760	-9360	4600
1045511115	500	8	-367360	4600	368000	-5400	-4760	-9360	4600
1045511116	500	8	-367360	4600	368000	-5400	-4760	-9360	4600
12345	500	8	-367360	4600	368000	-5400	-4760	-9360	4600
1045511118	500	8	-367360	4600	368000	-5400	-4760	-9360	4600

Figure 6
Clearing Tuition Interface in Current Semester

SUMMARY

This thesis structures an credit payment system with integrated data center based on NET technology. It not only facilitates the academic and financial management of the student enrollment statistics and costs, but also makes the charging more transparent and the enrollment fee and payment inquiries more efficient. Through integrated data center, we have achieved academic and financial data sharing, efficient and convenient. Currently, the system has been successfully applied. Since been put into operation, the customers are well received by its feature: flexible, reliable, convenient and efficient.

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