

Research Article

Integrated Design of Graduate Education Information System of Universities in Digital Campus Environment

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This study takes the digital campus construction planning of the high school as an example and determines the requirements of the postgraduate management information system under the digital campus environment through the analysis of the overall framework and technology of the digital campus. Combining the current situation of computer technology, network technology, and the actual situation of our university, the current mainstream B/S three-layer architecture is adopted, the web adopts the current popular Java Server Pages technology, and the struts framework connects to the Oracle backend database through the Java Database Connectivity interface to design the browser-side and server-side programs. The struts framework connects to the Oracle backend database through the Java Database Connectivity interface to design browser-side and server-side programs. The functional model and data flow model of the system were established through a detailed and effective analysis of the entire workflow of postgraduate students' training management during their school years. Then, the system analysis, design, and drawing of the swim lane diagram and data business flow diagram were carried out. The system was designed in detail in terms of system architecture, development tools, functional modules, and database design, and the core module of training program making in postgraduate training management was highlighted as an example to discuss the principles and methods in the construction of departmental business systems and informatization under the digital campus environment, and a flexible and efficient postgraduate management information system was realized. It standardizes the construction of data standardization in universities; does a good job of standardizing and normalizing information; improves the accuracy, validity, and real-time production of data collection and the real and safe unified management of historical data; and provides scientific and reasonable data support for the leadership to make relevant decisions.

1. Introduction

With the deepening of education reform, the scale of postgraduate enrollment has been expanding, and the data to be recorded and processed in the training management work has increased exponentially. To standardize management and improve the level and efficiency of postgraduate training management, many universities have established postgraduate management systems and related teaching support platforms one after another to realize the collection, processing, and statistical functions of basic teaching information, which reduces the manual processing work of management personnel, improves the working efficiency, and brings great convenience to teachers

and students of the whole university [1]. It reduces the manual work of management staff, improves work efficiency, and brings great convenience to the teachers and students of the school. However, from the perspective of the development trend of graduate education and teaching, there are still some unsuitable places in the informatization of graduate students in colleges and universities. However, from the perspective of the development trend of postgraduate education and teaching, there are still some unsuitable places for postgraduate informatization in colleges and universities, mainly in the following aspects: many postgraduate systems in colleges and universities were built earlier; the system construction did not follow the national standards and industry standards; the data structure

and data content were not standardized; it is difficult to ensure the consistency of data, resulting in difficulties in information and data sharing between systems; and it is difficult to achieve an upgrade and maintenance of the system [2]. Many schools do not include the construction of graduate education informatization into a purposeful, planned, and step-by-step system engineering project, and even if there is a better hardware and software environment, it is difficult to mobilize most teachers and students to participate in the construction of education informatization to the greatest extent due to the lack of a corresponding standardized system and standardized management [3]. Many systems are designed from the needs of administrators, only designing management functions, with less support for cultivation management closely related to students' learning activities, which cannot support the whole process of graduate students' learning activities, making it difficult for administrators to track and monitor the completion and quality of graduate students' studies and ensure the smooth progress of research work [4]. After collecting a lot of teaching information into the system, it only does simple query and statistical functions without deep processing and lacks multidimensional statistical analysis functions, which makes it difficult to provide management decision analysis information to school leaders and managers.

This study intends to draw on the development experience of other perfect systems, compare the more popular system development technologies, analyze the specific needs of the postgraduate training process in the light of the overall construction of our university digital campus, and share the data information of other systems in the digital campus through the data exchange and sharing platform. For example, the personnel information in the personnel system, the financial information in the financial system, the undergraduate major course information in the teaching service system, and the student accommodation information in the coordination management system, etc., to design a set of management information system suitable for the actual situation of postgraduate management. However, due to the lack of a corresponding standardized system and standardized management, it is difficult to mobilize teachers and students to devote themselves to the construction of educational information. Many system designs are based on the needs of managers, only designing management functions, and there is little support for training management that is closely related to student learning activities. It integrates various heterogeneous data in the digital campus, unifies the management of semistructured and structured data, eliminates information silos, and realizes real-time data sharing among systems [5]. For example, it provides authoritative data such as basic information of graduate students, cultivation, and degrees for the data sharing center; it extracts basic information of faculty personnel and additional information such as payment and accommodation of graduate students from the data sharing center, which ensures the consistency of data [6]. Before the design and architecture of the system, a prospective study on the data standards of the university was conducted, and the coding rules of human, financial, and material aspects were planned uniformly from the university, which laid a good foundation for the construction of the data sharing center in our university. In the design pro-

cess of the postgraduate management information system, it is designed to exchange data from the digital campus shared data platform and reserve the data interface for public information calling from the university's portal or other systems calling. For example, the integrated coding rules for personnel information from students to faculty members can provide a reference for the development of subsequent systems by eliminating data cleaning, transcoding, and filtering for the personnel database in the later stage.

It proposes the J2EE development platform of the academic affairs network management system; introduces in detail the digitalized resource construction, student academic supervision, and effective control, assessment of teachers' teaching and students' learning, and student file management modules of the university; and proposes how to optimize the functions of the information-based academic affairs network management system for the paper focuses on the digital campus teaching and learning management of universities. This paper focuses on the design and implementation of the digital campus academic affairs management system of colleges and universities and analyzes and discusses each functional module in the digital campus academic affairs management system of colleges and universities, which has a certain innovative value and has certain reference significance for the development of the digital campus academic affairs management system of other colleges and universities. In addition, computers can be used to select elective subjects for college teaching and carry out teaching assessments, which greatly saves the work pressure and work content of administrative teaching staff. Computer network technology allows each student to choose elective subjects independently through the computer, which provides sufficient autonomy for students and greatly improves work efficiency, allowing teaching staff to have more time to deal with other things and meet the needs of students at different stages.

2. Current Status of Research

Although the current university networked teaching management model has improved, it still lacks a lot of rationality and humanized design. Based on the above considerations, the development of an artificial intelligence-driven teaching management information system suitable for various needs is particularly important for improving the efficiency and quality of managers and enhancing the image of the school [7]. For example, the British scholar Aithal and others mentioned that some institutions in the UK and France have built information technology earlier, and each university focuses on the construction of a web platform in the academic affairs network management system [8]. Through decades of development, they already have a perfect and mature teaching system, teaching service system, office system, library system, campus entertainment system, and so on [9]. These system platforms have had a great impact on students, teachers, administrators, and community residents, facilitating students' spare time, improving office efficiency, improving learning environment and methods, and accelerating the pace of transformation of an information-based

society [10]. The digital campus is better than UEAS Academic Affairs Management System, which combines the advantages of both and builds a better application system, deploying C/S computing mode for parts that need a lot of calculations, such as data import and data analysis, and B/S computing mode for parts that do not need too many calculations, such as information query and display [11]. The C/S computing mode is open to a few users who need it, and the B/S computing mode is developed for all users of the system [12].

Many schools have established student information management systems, which provide a solid foundation for modern network education. The technical aspect of the management information system led to innovation and reform of the traditional office model, thus creating a previously unavailable, new form of efficient modern office model [13]. As we all know, for the long-term sustainable development of each enterprise, there is a need for an efficient and convenient management system; they will mostly choose reliable public generally recognized software companies to cooperate in the development, but the required development costs and maintenance costs will become very difficult to bear, which for the market users, will be a cost-effective automated management information system [14]. This paper will design and study the most cost-effective management information system to meet this demand [15]. In the initial stage, the construction of information technology in universities only stopped at the registration and storage of data and only established a relatively closed local network on campus, and the individuals who used this network only used it in the local area network, and with the improvement of requirements, the university built a medium-sized campus network, which improved the efficiency of using the campus network and accelerated the improvement of teaching quality to a certain extent [16]. A large information center was built, and from the initial embryonic stage to the present day, a complete information system has been built, which has greatly improved the degree of digitalization of the school [17]. From the failed cases, we summarized where its shortcomings lie and developed a student management system suitable for education according to our characteristics [18]. At present, all major universities have built and improved their campus networks, and the investment in hardware has taken shape, slowly entering the middle stage of the information technology era.

Based on ensuring information security, it is registered and published on the school's unified application platform to realize the sharing of information results within the school, and on this basis, it is integrated with Internet applications. The supply of highly experienced application services and integrated access to services to students greatly increases the dependability of users. With integrated services centered on high usage, campus faculty and students can not only enjoy the services provided by the integrated service platform but also provide their own opinions on problematic campus facilities or campus services that need to be improved, supporting decision-makers at all levels to improve and study business models. The test cases of some functions of the digital campus teaching management sys-

tem are explained. The key involves book lending test cases, user login test cases, grade retrieval test cases, adding academic records test cases, and specific descriptions of the system performance tests.

3. Analysis of Integrated Design of Information System for Graduate Education in Digital Campus Universities

3.1. Technical Analysis of Graduate Student Education Information System. The system uses an on-demand B/S technology architecture. This system also uses a J2EE-based development framework and runtime environment to maximize the inclusion and integration of existing and to-be-built applications [19]. For example, provide the data sharing center with authoritative data such as basic information, training, and degrees of graduate students; extract basic information about teachers and workers from the data sharing center; and additional information such as postgraduate payment and accommodation to ensure the consistency of the data. The SOA service-oriented architecture simplifies the processing mode of business process integration between systems, simplifies the difficulty of cross-system interface integration due to changes in business requirements, and achieves loose coupling between systems [19]. The Oracle database with excellent performance is selected as powerful. A distributed software architecture is used to realize the integration of data, services, and business processes utilizing application integration, and the digital campus is built in steps under a unified top-level design. Each system operates independently, and cross-system invocation and collaboration are realized through standard and clear interfaces.

The server is usually a high-performance PC, workstation, or minicomputer with a large database system such as Oracle or SQL Server. The B/S architecture has three main components: client browser, application publishing server, and database server, as shown in Figure 1.

The construction of a digital campus is a long-term and continuous construction process that matches the strategy of the university. It is necessary to consider the results and data of the university's existing information technology construction, and at the same time, it is necessary to lay the foundation and indicate the direction for the future development of the university's information technology, so that the construction of the digital campus is a continuous improvement and continuous updating process over time and can effectively form the long-term accumulation of the university [20]. It does not break with the passage of time, changes in technology, changes in management personnel, and changes in thinking. Digital campus construction is to provide advanced and comprehensive informatization solutions for universities to build their core competitiveness through internal resource integration and accumulation of existing informatization construction achievements. Digital resource construction, student academic supervision and effective control, teacher teaching and student learning evaluation, student file management, and other modules propose how to optimize the functions of the information-based

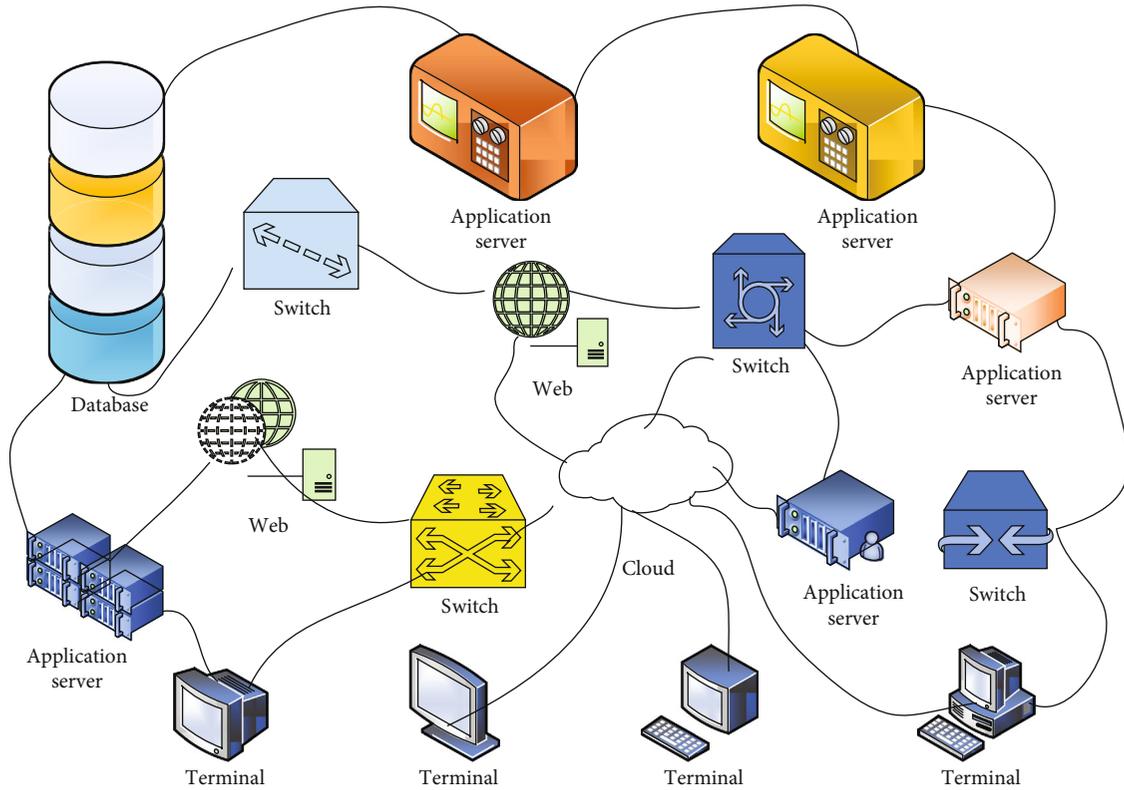


FIGURE 1: B/S architecture diagram.

educational administration network management system and provide for the sustainable development of university educational administration network management reference effect. It guides the construction of a digital campus by formulating a long-term informatization construction plan of the university, comprehensively constructing university-level management information system, optimizing existing management process and management mechanisms, improving administrative management efficiency, and saving management cost of the university while ensuring the realization of strategic objectives of the university. Strengthen the construction of a basic support environment to ensure the safe, stable, and reliable operation of the system; build the basic platform of digital campus based on the construction framework of "hardware cluster, data concentration, application integration, and service integration." Optimize the means of collaboration among personnel at all levels of colleges and universities, create a life service platform, teaching service platform, and scientific research service platform, and build a comprehensive digital campus service platform for teachers, students, and staff [21]. It standardizes the construction of data standardization in colleges and universities; standardizes and unifies the information; improves the accuracy, validity, and real-time of production data collection and the real and safe unified management of historical data; and provides scientific and reasonable data support for the leadership to make relevant decisions.

In the era of information technology, the education management of colleges and universities is also facing greater challenges. The construction and management of digital campuses

in colleges and universities are the primary factor affecting the continuous improvement of the quality of education and teaching in colleges and universities [22]. In Huizhou Engineering Vocational College, the college proposes to pay attention to the construction of a digital campus network system, and in the teaching-centered mode, it is necessary to guarantee good teaching quality and good teaching mechanism, precisely for the establishment of the current higher vocational college at the early stage, to establish an integrated working system platform, which has more efficient work efficiency compared with the traditional campus management and can also serve the teaching staff and students accurately [23]. It allows data to generate more shared value and establishes a data intervisiting mechanism. Focusing on on-campus information applications, it solves various current management problems and serves campus faculty and students. This paper focuses on the design and implementation of the digital campus academic affairs management system of colleges and universities and analyzes and discusses each functional module in the digital campus academic affairs management system of colleges and universities, which has a certain innovative value.

Many colleges and universities implement the management mode of large academic affairs and put all the work related to education and teaching into academic affairs, so whether the school's academic affairs management is smooth and the quality of academic affairs management is directly related to the quality of education and teaching. In recent years, Huizhou Engineering Vocational College has been upgraded to a higher vocational college by merging several secondary schools, and the management mode needs

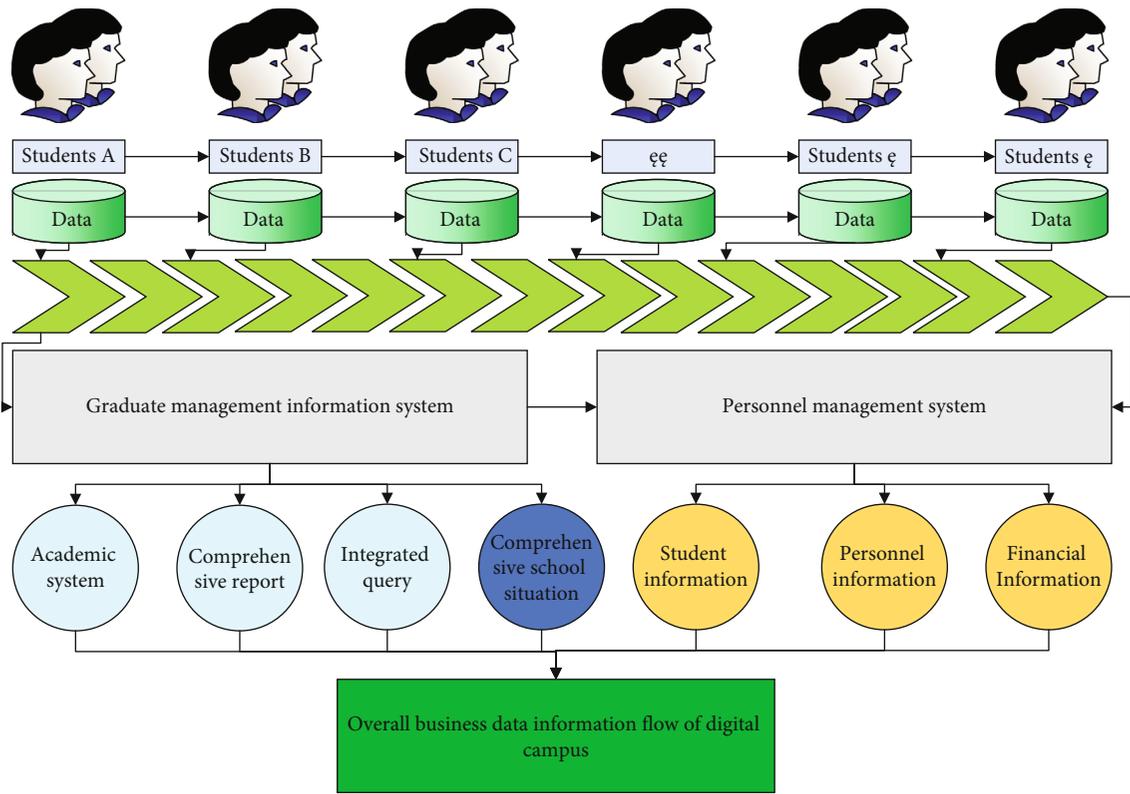


FIGURE 2: Overall business data information flow of digital campus.

to be changed continuously. At the same time, as the college continues to expand and transform, the academic administration will also face increased pressure. To maximize the inclusion and integration of existing and to-be-built applications, through the SOA service-oriented architecture, it simplifies the processing mode of business process integration between systems, simplifies the difficulty of cross-system interface integration due to changes in business requirements, and realizes loose coupling between systems. To adapt to the changing needs of academic affairs management, the traditional manual work can no longer meet the needs of complex academic affairs information management, which requires us to change our concept and adopt modern means to manage the current academic affairs information and continuously improve the management of academic affairs management for all teachers and students of the school, as shown in Figure 2.

The construction of a digital campus requires the school to establish its own data code rules, and to the maximum extent consistent with the education management informatization standard (Ministry of Education), relevant national standards, and relevant industry-standard codes, reduce the duplication of code usage, and consider the need for future code expansion for the construction and maintenance of code rules, i.e., school-defined data standard rules. The database server adopts a minicomputer system, and through physical partitioning technology, the informatization campus database and the one-card database are run separately in different partitions, while a separate partition is used as the environment for database testing and development. It

is planned to add a set of disk array systems with the same configuration as the main storage system in the offsite server room as the offsite disaster recovery center and realize the synchronous or asynchronous partial or complete replication of data from the main storage center to the disaster recovery center through the configuration of fiber optic switch plus long-distance transmission interface module and data mirroring software.

The application servers are recommended to use WebSphere distributed load balancing deployment architecture and the entire deployment. The outermost layer is a dedicated hardware load-balancing device and can be deployed as a dual-computer active-active high availability mode, which is responsible for providing load balancing and high availability guarantee for HTTP (80) traffic from users to the HTTP front-end server; the middle is two WebSphere HTTP servers, which act as task schedulers for the back-end. These two HTTP front-end servers function as task schedulers of the information portal platform and digital campus application servers at the back-end and are responsible for providing load balancing and high availability for user requests to access the information portal and application systems at the back-end; the back-end is a WebSphere Application Server Cluster member server. The construction of the digital campus is a process of continuous improvement and renewal over time, which can effectively form the long-term accumulation of the school. It does not lead to a break with the passage of time, technological development and changes, changes in management personnel, and changes in thinking.

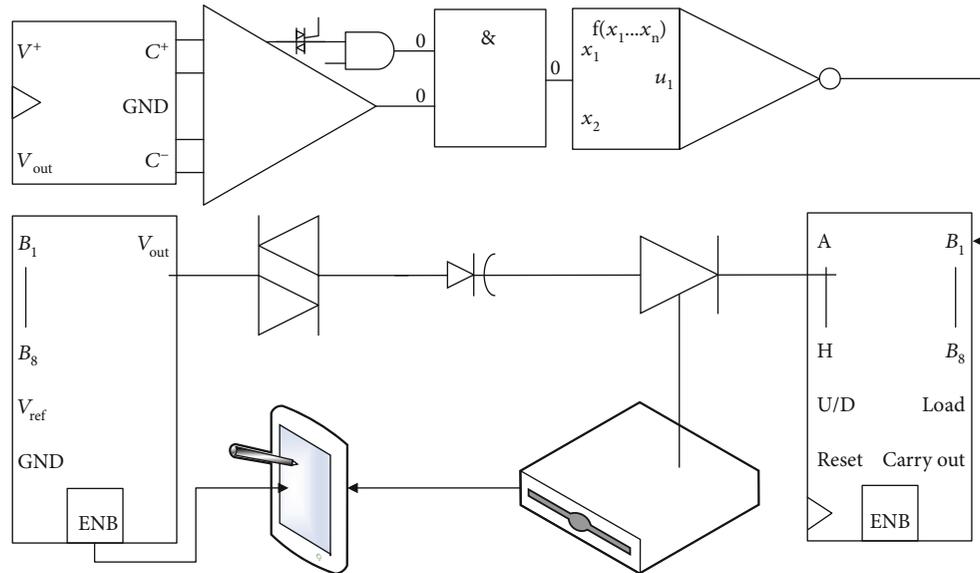


FIGURE 3: Schematic diagram of the unified login and authentication process.

The graduate school and colleges determine which courses need to be offered each semester according to the cultivation program and calculate the number of required and elective courses according to the student cultivation program and provide comprehensive inquiries of course information, output, and print course statistics, and other functions. The graduate school and all colleges adopt the computer-aided manual scheduling method according to the courses already offered in the current semester to determine the teachers, time, and location of each course, and the system provides strict conflict verification of teachers and classroom resources and provides automatic generation and query functions of the curriculum. Students can be scheduled manually during the scheduling process, and the system will automatically check whether students have conflicting class times. When scheduling classes in a new semester, the training office or college can refer to previous scheduling information and copy the scheduling information of certain courses as needed to reduce the maintenance workload.

3.2. Digital Campus Environment Living System. The smart campus software system is the window of the school's informatization construction, which can show the information of each interface for students and can allow users to easily find the desired information or resource portal, etc, reduce code reuse rate, consider the need for future code expansion, and carry out the construction and maintenance of code rules, that is, calibrate data standard rules. The database server adopts a minicomputer system and runs the information campus database in different partitions through physical partition technology. All the platform systems of the smart campus should be reflected in the school portal, and school news and notices can be released in time to show the development and progress of the campus. The construction of the campus information portal is not only a window for the school to display to the outside world but also an

important platform for teachers, students, faculty members, and other personnel to carry out unified identity authentication, based on which the entrance to other application systems can be easily found, providing great convenience to users. We believe that an important symbol of a digital campus is the construction of a campus information portal [24]. If the campus information portal is not well planned, it will be difficult to carry out the whole digital campus construction in depth. The training office or college can refer to the past scheduling information and copy the scheduling information of certain courses as needed to reduce the maintenance workload. The information portal is a center of various information collections, which can provide relevant information inquiry and release some information related to the column, which will be displayed on the school's portal after review. The campus portal is a large network platform integrating news release, content management, video on demand, image retrieval, full-text search, and other functions, as shown in Figure 3.

An intelligent access control system uses a card access control machine, license plate recognition, remote identification, and other access control equipment for linkage integration. In addition to controlling the entry and exit of vehicles, it can further calculate and control the number of live-restricted parking spaces, strengthen the antitheft/prevention function, and make the vehicles pass through the entrances and exits more effectively identified and managed [25]. All-important departments of the college, training areas, and machine rooms are accessed using access cards, and the permissions of each faculty member and student can be managed in the background. On this basis, it can be combined with a personnel attendance system to realize intelligent attendance and unified access to the college network for remote management. The digital campus is a system that takes the network and digital information as the basis and makes the teaching resources more fully utilized

by students, teachers, and managers. Teachers, in addition to having the same operation rights as students, can also access the teaching videos and animations of relevant courses through this system. Administrators can use this system to efficiently integrate school-related information and can release daily school arrangements to students and teachers through this platform, such as notification of school closures and power outages, so that the information notified to students, teachers, and other administrators can be notified within the first time. The above are the functions that can be provided by the smart card, but some additional functions will be added later to improve the interface of the system, to improve the quality of the system to achieve the purpose of improving the core competitiveness.

It completes the functions of the electronic library card and becomes the input medium of the library management application system. The system replaces the campus card with the library card. Students need to verify their identity when entering the library, and they need to swipe their cards at the card machine at the entrance of the library before the library will open, and they also need to swipe their cards to register their identity information when borrowing books. Through this system, the relevant information of the school can be efficiently integrated, and the daily arrangements of the school can be released to students and teachers through this platform, such as the notice of rest and power outage, so that the information notified by the school can be notified in the first-time students, teachers, and other administrators. The system uses the student card instead of the key, when students enter the dormitory need to brush the card, identity verification, only in the corresponding dormitory building student card can open the dormitory door, in the dormitory such as the population, male and female dormitory main channel, training building entrance to install access control equipment, access control system is conducive to improving the security of the school, prevent irrelevant workers step into the campus, affect the normal campus environment order, effectively prevent internal theft, burglary, and campus violations from occurring. The consumption system mainly includes the meal charge system for teachers and students, the supermarket charge system, and the drinking water charge system. The main function of the consumption system is to make the daily consumption of students and teachers inside the school safer and more transparent, for example, eating in the school's dining hall will send the daily consumption records to the APP, which can show the dining consumption for a month and the average daily consumption, etc. In addition, other consumption of students inside the school will also be recorded, such as drinking water and supermarkets, in which no cash consumption and old card spending.

Teachers and students will be integrated with the comprehensive application system to realize data sharing so that the comprehensive application system for teachers and students will become a whole and create a convenient, fast, and humanized campus electronic life for teachers and students. It is a comprehensive information platform for teachers and students to enroll, teach, train, live, seek jobs, learn skills, graduate, and resign. Nowadays, in the era of

rapid development of information technology, this is both an opportunity and a challenge for the school management system. The establishment of an integrated work system platform has more efficient work efficiency than traditional campus management and can also accurately serve faculty, staff, and students, to a greater extent, allow data to generate more shared value and establish a data exchange mechanism. On the one hand, the background of this era provides a more excellent network environment for the information system, and on the other hand, the information system faces more dangers due to the rapidly developing network environment. While the business is expanding, the emergence of education administration system not only provides users with a convenient and quick way to manage various tedious education affairs but also liberates the education department, streamlining administration, reducing recurring expenses, and using existing resources can bring greater benefits, as shown in Figure 4.

Nowadays, in the era of rapid development of information technology, this is both an opportunity and a challenge for the school management system. On the one hand, the background of this great era provides a more excellent network environment for the information system, and on the other hand, the rapidly developing network environment makes the information system face more dangers. While the business is expanding, the emergence of the education administration system not only provides users with a convenient and quick way to manage various tedious education affairs but also liberates the education department, streamlining administration, reducing recurring expenses, and using existing resources can bring greater benefits. The educational management system has been developed following the characteristics of universities. The key covers teaching management, teacher management, curriculum management, examination management, and training management [26]. The rational arrangement of these divisions of labor makes staff members more focused on their jobs and greatly improves the efficiency of their work.

To realize the decentralized campus monitoring system, we must first ensure the stability and security of the database and secondly realize the perfect unification of the database and each technology, such as network monitoring [27] and authority allocation, and unified management of all devices and users. The system can greatly simplify and standardize this process, realize information sharing and business collaboration between the upper and lower departments, and connect with departmental budgeting, recruitment, accounting, and fund clearing systems. The establishment of an online payment system mainly solves the problem of reimbursement of research funds. In colleges and universities, teachers conduct various kinds of research, in which the accounting and issuance of funds generated is a complex process. This system can greatly make this process streamlined and standardized; realize information sharing and business collaboration between upper- and lower-level departments; connect with a departmental budget, procurement, accounting processing, and fund clearing systems; realize asset change application; approve financial accounting; and realize the whole life cycle management of the whole assets.

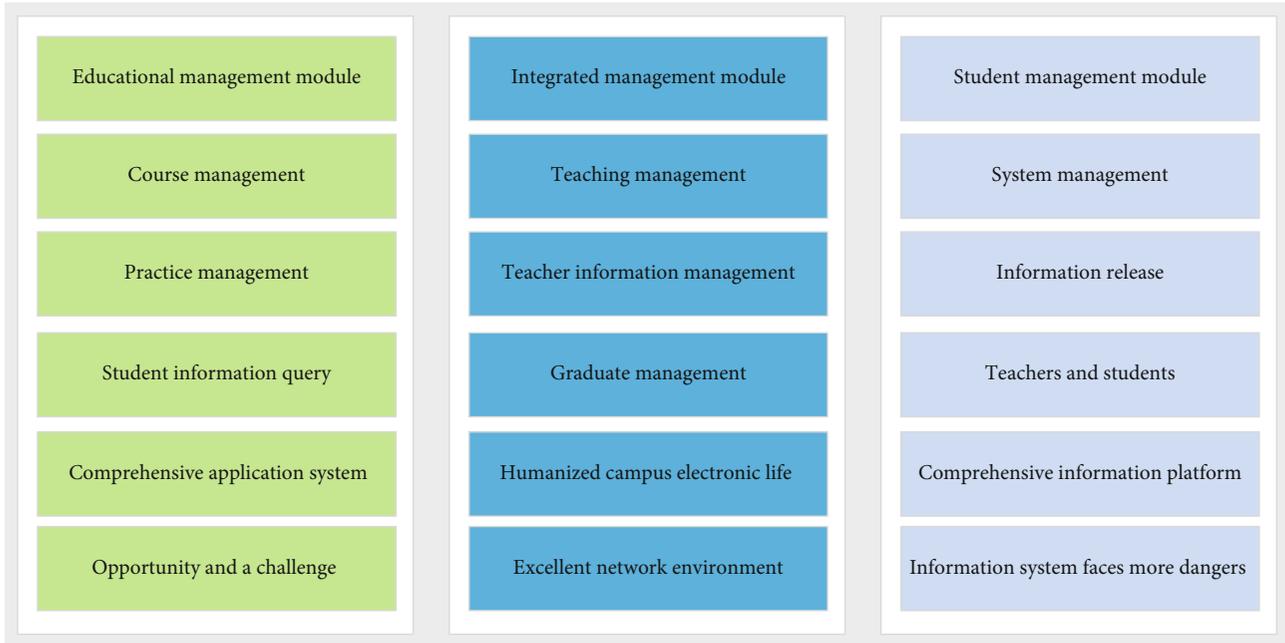


FIGURE 4: Management system function module.

4. Analysis of Results

4.1. All-in-One System Testing. Software testing, that is, the use of test equipment to carry out performance and functional tests on the product according to the test strategy and procedures, and even the design of different test equipment according to the requirements, was designed to maintain the system and the comprehensive evaluation of the various types of problems that arise in the test strategy. After the test cases executed, the exceptions are followed up to ensure that these developed products meet the detailed regulations. When designing the above test cases, the status of illegal user input and boundary conditions should be analyzed. The user's software should be tested to prevent any surprises. Confirmation of the test results should be carried out, and the errors of the test are often determined by another person when carrying out the confirmation. For the more prominent problems, a meeting can be considered to discuss and determine. With the help of the test results, it is possible to find out if the problem exists and the severity of the problem. The design goal of the test case for adding student status is to test whether the function of adding student status can be used to verify whether the user's input information is legal. When the data entered by the user is incorrect, the root cause of the error should be given and entered again. The goal of the Add Student Registration test case is to test whether the Add Student Registration feature is available to verify that the user's entry is legitimate. When the data entered by the user is wrong, the root cause of the error is given and entered again; after the user enters the accurate test data, is it possible to add the school registration information. During the system testing period, three rounds of testing were implemented, and the results of each round were counted after finishing the testing operation, and the

related fixes were implemented after each round of testing. The bug count record table for the three rounds of testing is detailed in Figure 5.

Performance testing intends to verify whether the performance of the application system can meet the relevant regulations of users and can learn the outstanding problems such as system bottlenecks and performance in the application system and provide powerful help for software improvement and overall optimization. In the teacher space, teacher users can complete three basic tasks: managing student information, managing course videos, and live teaching. In student information management, teachers can view the information of all students who choose the course they teach, as well as manage students' grades after completing the course. In Manage Course Videos, teachers can view their existing course video information and add new course videos. Once teachers upload their courses, they can see the courses they have added on the Watch Course page. Figure 6 shows the interface for watching course videos, where teachers can see their course type, number, name, and view the entire list of course videos. In addition, teachers can enter under the Search Course Videos tab to search for other teachers' course videos, which can also be watched and studied after purchase.

Software testers are generally separated from system developers, i.e., software testers are specialized in software testing. Black box testing is mainly functional testing. It mainly tests the functions of the software. It is assumed that the tester does not understand the functional structure of the system and knows the program structure of the system; the tester mainly tests whether the various functions of the software system meet the requirements. White box testing generally uses the test case approach, in which the system functions of the software are visible to the tester and the software tester understands the functional structure of the

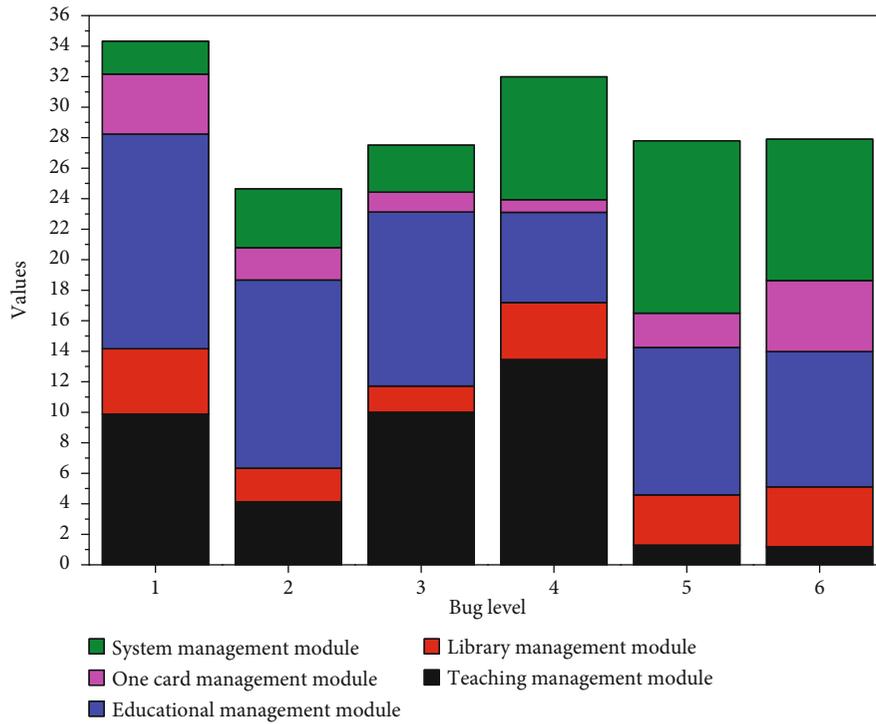


FIGURE 5: User login test case.

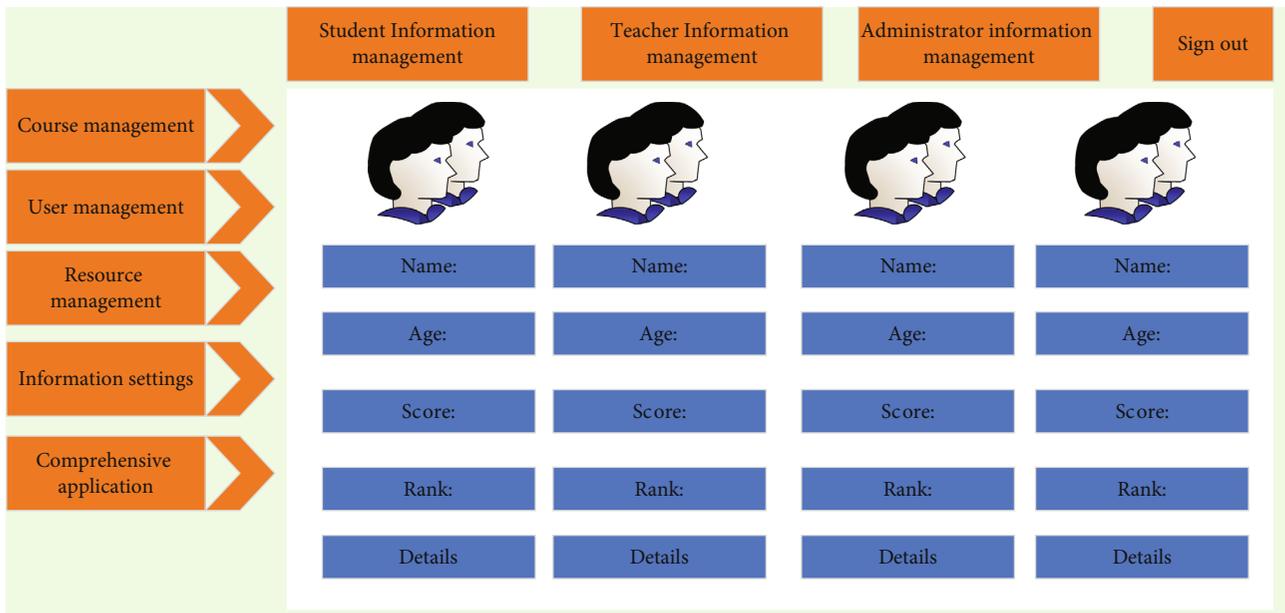


FIGURE 6: User information management.

system and knows the program structure of the system; black box testing, which is mainly functional testing, mainly tests the functions of the software, if the tester does not understand the functional structure of the system and knows the program structure of the system. The tester does not understand the functional structure of the system and knows the program structure of the system; the tester mainly tests whether each function of the software system meets the requirements.

4.2. Performance Test Results. In addition to completing the basic functions, the load capacity of the system must be tested to make the user experience better. In this paper, we use HBase, a nonrelational database with massive resource storage, to form a high-performance cloud storage environment during the development of the system, and we conduct a stress test on the database below. First, we import millions of simulated data in the educational storage resource table and then conduct four tests of sequential read, sequential

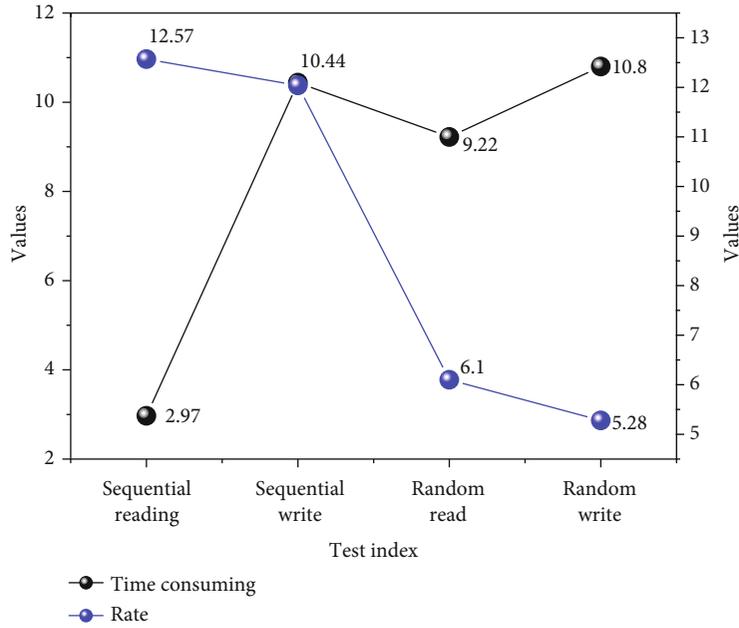


FIGURE 7: Database stress test.

write, random read, and random write by the test tool that comes with HBase. The test results are shown in Figure 7.

From Figure 7, using the HBase database as the cloud service center of the system can complete the storage of massive educational resources and meet the access requirements of users. About the relevant requirements of digital campus construction, a unified information portal platform design, a unified identity demonstration platform design, and a unified information resource planning quasicomstruction are given; the above design enables the campus to integrate and extend the existing system, which greatly reduces the cost and achieves the expected service effect. In the construction of the digital campus teaching management system of higher education institutions, various information resources of the school are integrated in a scientific and standardized way, and unified authority control, resource management, and user management are formed so that the school can develop better with the reengineering of organization and business process; system innovation and management innovation are carried out through the construction of the project, and finally, information education, scientific management, and choice are completed in a more standardized way. The basic functions of the digital campus teaching management system are realized, and on this basis, through the exploration of the construction of digital campus teaching management system in higher education institutions, and employment-oriented digital campus structure is formed, combining the characteristics of higher education institutions, with comprehensive and reasonable planning, highlighting the services for teachers, students and employing departments, and taking students' employment as the fundamental purpose.

Three functional modules, including cloud service center, teaching resource management, and remote classroom, demonstrated the implementation effect of the smart teaching system proposed in this article, completed the functional

test of the system and performed performance test on the load capacity of the database and the function of the service interface. Finally, the advantages of the system proposed in this paper are analyzed. In addition, the system services need to be tested; here, two services are selected for stress testing, resource management, and remote classroom; the specific test method is to select the two types of interfaces provided by the service read and write, in a minute time, by changing the number of clients and send requests, to obtain the average of the number of outputs per minute for each service, in pages/min. Test results are shown in Figure 8.

By analyzing the data in Figure 8, the system can still run stably and meet the basic requirements of the design under the high concurrency of the service. A brief overview of the requirements analysis and framework design to be completed in the specific implementation of the intelligent teaching system is given; then, the specific development environment of the system and the relevant details of the system service implementation are introduced; then, the effect of the implementation of the intelligent teaching system proposed in this paper is demonstrated from three functional modules, such as cloud service center, teaching resource management, and remote classroom, and the functional test of the system is completed, and the load capacity of the database. Finally, the advantages of the system proposed in this paper are analyzed.

It introduces the requirements of the digital campus academic affairs management system, analyzes the performance and requirements of the university's academic affairs network management system, and analyzes the detailed requirements of each management module and usage function; introduces the application of the digital campus academic affairs management system in the process of using, such as information resource sharing, academic completion monitoring, and teaching assessment, and optimizes the design of each management module; and carries out the interface implementation

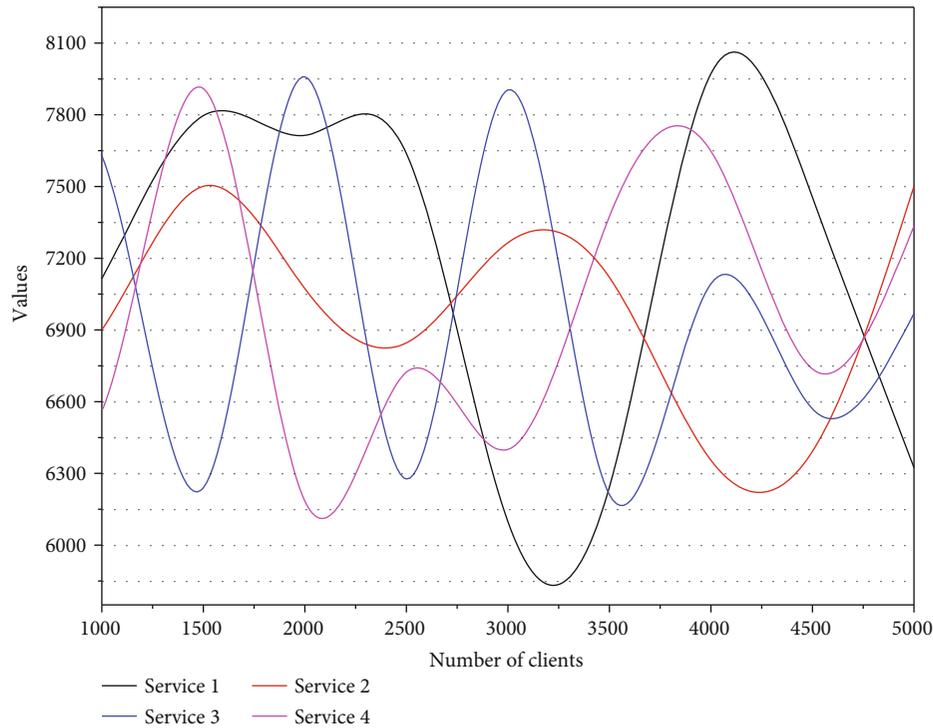


FIGURE 8: Service stress test.

and testing of various data and management rules in the process of using the academic affairs network management system developed in this project. The design of the management modules is optimized, and the interface of the academic affairs network management system developed in this project is implemented and tested in the process of using various data and management rules in the school. It is a web platform system focusing on the design of the academic affairs network management, using J2EE as the development platform and a hybrid C/S and B/S structure, and proposes an innovative information-based academic affairs network management system. Through the digital campus academic affairs management system, the sharing of information resources and application operations are realized; based on the digital campus academic affairs management system, course scheduling, learning achievement monitoring, and teachers' teaching quality assessment are carried out; it has the significance of promoting and reforming the use and development of the university academic affairs network management system.

5. Conclusion

This paper completes the design of the university postgraduate management information system, which meets the actual situation and requirements of postgraduate management; realizes the functions of postgraduate academic registration management, training program management, and training plan development; and provides convenience for postgraduate training management. The system started trial operation online, and the system database software was deployed on two physical servers using Oracle, and the

application server was deployed on two virtual machines on blade servers using WebSphere 6.1. The graduate student management information system adopts the concept of "big platform and small application" in the design of a digital campus system. The struts technology architecture based on J2EE architecture is designed with high efficiency and reusability, which makes the system have good maintainability and portability. While managing the system, the only data format standard belonging to the graduate system was established, which lays the foundation for the later digital campus integration construction, simplifies the steps of sharing data, and improves the operational efficiency of the system. This study focuses on the technical solution design for the needs of a single application system of the postgraduate management information system. The digital campus construction will have a large amount of personal information about the transmission, the vast majority of which can be said to carry confidential information, and the orientation of information also requires communication and coordination between school departments and authorization.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

All the authors do not have any possible conflicts of interest.

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