Exploration and Practice of Informationization Construction in University Administrative Management under the Background of Internet+

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Abstract. This paper investigates the development of an informatization platform for university administrative management under the Internet+ initiative. It presents a system architecture combining microservices and frontend-backend separation to enhance personnel, academic, and financial management. The agile development approach is exemplified through personnel recruitment, highlighting critical technologies. User experience is assessed via surveys and data analysis, revealing that the platform markedly improves administrative efficiency and decision-making support. This research offers valuable insights for advancing university management informatization.

Keywords: university; administrative management; informationization; Internet+.

1 Introduction

The rapid evolution of Internet technology and higher education necessitates the informatization of university administrative management to enhance efficiency, optimize resources, and support decision-making. Current systems face challenges like fragmented construction, inconsistent data standards, and inadequate coordination. This paper explores a practical informatization solution tailored to university needs, covering demand analysis, architectural design, functional implementation, and evaluation[1]. It aims to provide actionable insights and experiences for advancing university management informatization.

2 Demand Analysis

2.1 Business Demand Analysis

The demand for informatization in university administration arises from the complex and diverse nature of school management. As higher education expands, administrative areas including personnel, academic affairs, research, finance, assets, and logis-

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tics management also grow. For instance, large universities with over 3000 staff face inefficiencies with traditional manual methods[1]. Furthermore, interconnected processes like research funding involve multiple departments, underscoring the need for a unified, efficient, and collaborative information management platform to enhance efficiency, streamline processes, and refine management.

2.2 Functional Demand Analysis

The university administrative management platform must fulfill several key functions: Firstly, it should integrate data across all departments into a unified data center for decision support. Secondly, it needs to streamline and automate processes to minimize manual tasks. Thirdly, it should enable cross-departmental collaboration to enhance efficiency. Fourthly, the platform must perform statistical data analysis for intelligent decision-making. Finally, it should offer a personalized and intelligent service portal for teachers and students, improving user experiences[2]. Each function is crucial for optimizing management and supporting advanced administrative capabilities. Table 1 lists the main functional modules and their contents of the information management platform.

Table 1. Main functional modules of the information management platform

Functional Module	Main Contents
Information Integration	Data center, data exchange, data standards
Process Management	Process engine, form design, process monitoring
Collaborative Office	Document management, instant messaging, mobile office
Data Analysis	Statistical analysis, data mining, visualization presentation
Service Portal	Personal portal, information dissemination, online service hall

2.3 Non-functional Requirement Analysis

In addition to functional requirements, the informationization management platform also needs to meet some non-functional requirements. Firstly, performance requirements: the platform should be able to support high-concurrency access, ensuring system responsiveness and stability. Secondly, security requirements: the platform should provide comprehensive security mechanisms such as identity authentication, access control, and data encryption to ensure the security of data and users. Thirdly, usability requirements: the platform should have a user-friendly interface and simple operation processes to reduce user learning costs. Additionally, the platform should have good scalability and maintainability to adapt to the continuous changes and developments in university management business[3].

3 System Architecture Design

3.1 Overall Architecture Design

The overall architecture of the university administrative management informationization platform adopts the current popular design concept of front-end and back-end separation and microservices. As shown in Figure 1, the entire system is divided into four layers: the front-end application layer, microservices layer, data services layer, and infrastructure layer. The front-end application layer includes various application forms such as web-end and mobile-end targeting different user groups, responsible for providing a user-friendly interaction interface. The microservices layer divides the various business functions of the system into multiple independent microservices, such as personnel management services, academic affairs management services, and financial management services. Communication between services is achieved through RESTful APIs, realizing the modularization and decoupling of system functions[4]. The data services layer provides unified data access interfaces and data storage services, including relational databases, non-relational databases, distributed file systems, and other data storage methods to meet the storage requirements of different types of data. The infrastructure layer provides various IT resources required for system operation, such as servers, networks, and storage, and achieves resource elasticity and flexible scheduling through technologies such as virtualization and containerization.

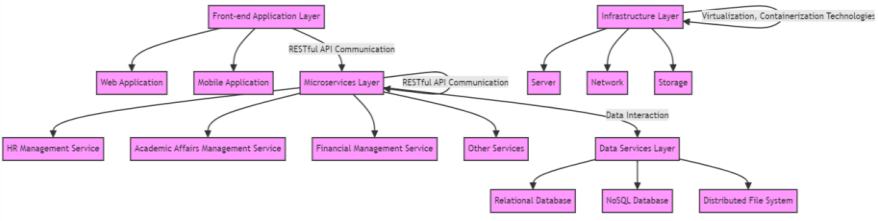

Fig. 1. Overall Architecture Diagram of University Administrative Management Informationization Platform

3.2 Core Module Design

The microservices layer contains core modules such as personnel, academic affairs, research, financial, asset, and logistics management. For instance, the personnel management module handles faculty and staff data including basic, position, contract, attendance, and performance information, supporting functions like recruitment, contract and attendance management, and performance assessment. Each function is divided into sub-modules with tailored domain models and business logic[5]. The recruitment sub-module, for example, includes domain models for recruitment plans, channels, applicants, and interviews, orchestrating the complete recruitment process from planning to onboarding.

3.3 Key Technology Introduction

In the design and implementation process of the higher education administrative management informatization platform, we have adopted a series of advanced technologies and tools. Front-end development technology: Vue.js and Element UI are used for interface development. This combination supports rapid development and responsive design. Such a technological choice ensures consistency of the user interface (UI) across different devices while simplifying the management of front-end code, thus enhancing development efficiency. Through these technologies, we are able to provide users with an intuitive and smooth interactive experience. Back-end development technology: The back end adopts the Spring Boot framework, which supports rapid development and deployment of microservices architecture. Spring Boot's auto-configuration and dependency injection features alleviate developers' configuration burdens and accelerate the development process. Additionally, Spring Cloud provides a convenient method for communication between microservices, which is crucial for maintaining service health and facilitating rapid fault recovery. Data storage technology: For data storage, we have chosen a combination of MySQL and Redis. MySQL handles structured data, while Redis serves as a high-speed caching middleware, optimizing response times for frequent queries and significantly improving system performance. This configuration supports data access in high-concurrency scenarios, ensuring platform stability and data real-time availability. Containerization technology: Leveraging Docker container technology, we have achieved rapid deployment and automated management of applications. Containerization not only simplifies deployment and testing processes but also enhances application consistency across different environments, thereby reducing problems caused by environmental differences. Logging and monitoring technology: To effectively monitor application performance and quickly identify issues, we have built a log analysis and monitoring system based on Elasticsearch, Logstash, and Kibana (ELK Stack). This system automatically collects and analyzes log data, enabling the operations team to monitor application status in real-time and respond quickly to system anomalies[6].

4 System Implementation

4.1 System Development Process

The development of the university administrative management platform adheres to agile principles using the Scrum framework. The process is segmented into 2-week iterative cycles called Sprints. Each Sprint begins with a planning meeting where team members outline goals and break down tasks into user stories. Daily stand-up meetings facilitate progress reports and immediate issue resolution. At each Sprint's end, a review meeting showcases the functionality to clients for feedback, while a retrospective meeting gathers insights and improvement actions. This agile approach enhances adaptability to requirement changes, and improves development efficiency and product quality[7].

4.2 Implementation of Core Functions

Personnel management, specifically the personnel recruitment sub-module, is a core function of the university administrative management platform. This process utilizes Spring Boot and MyBatis for the domain model's persistence and logic, based on detailed business requirements. The architecture separates front and back ends: the front end, using Vue.js and Element UI, handles interfaces for recruitment planning and candidate evaluation, while the back end provides RESTful APIs for operations like resume upload and filtering, using Apache POI for parsing documents[8]. MySQL and MongoDB store structured and unstructured data, respectively, streamlining recruitment from planning to onboarding. Table 2 shows some business metrics of the personnel recruitment sub-module.

Table 2. Business Metrics of the Personnel Recruitment Sub-module

Metric Name	Metric Value
Recruitment Plan Completion Rate	95%
Resume Screening Pass Rate	60%
Average Number of Interviews per Person	2.5 times
Candidate Onboarding Rate	80%

5 Experiment Evaluation

5.1 User Experience Evaluation

To evaluate the user experience of the university administrative management informationization platform, we employed methods such as questionnaire surveys and user interviews, collecting user feedback within one month after the platform's launch. We conducted sampling surveys on different types of users (including administrators, faculty, and students), distributing a total of 500 questionnaires and receiving 476 valid responses, with an effective response rate of 95.2%. The survey results showed that the overall satisfaction score of the platform was 4.2 (out of 5), with 87% of users finding the platform interface user-friendly and easy to use, and 90% of users feeling that the platform met their daily work and study needs[9]. In user interviews, we focused on understanding users' usage experiences and suggestions for the platform. Most users expressed that the platform's launch greatly facilitated administrative management work, improved work efficiency, and reduced the use of paper materials. At the same time, users also provided some suggestions for improvement, such as adding mobile applications and optimizing search functionality. Figure 2 illustrates the results of the user satisfaction survey.

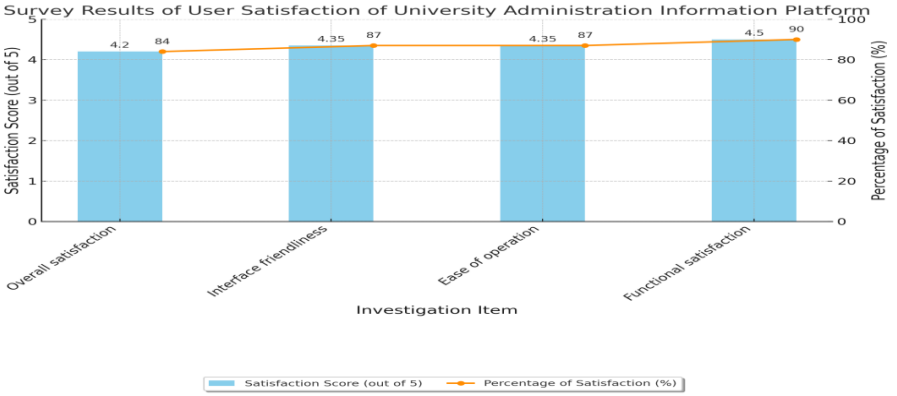

Fig. 2. Survey Results of User Satisfaction for University Administrative Management Informationization Platform

5.2 Evaluation of Actual Application Effects

To evaluate the actual application effects of the university administrative management informationization platform, we conducted quantitative analysis from aspects such as business volume, work efficiency, and data accuracy. By comparing the data before and after the platform's launch, we found that the application of the platform significantly improved the efficiency and quality of administrative management work[10]. Taking personnel management as an example, after the platform's launch, the recruitment cycle was shortened from 30 days to 15 days, reducing recruitment costs by 50%, and the accuracy of personnel information increased from 85% to 98%. In financial management, the platform's application reduced the approval time for reimbursement processes from 5 days to 1 day, and the error rate of reimbursement documents decreased from 3% to 0.5%. In academic affairs management, the processing time for student course selection and grade inquiries was reduced by 60%, and the accuracy of academic data reached over 99%. Table 3 shows a comparison of some business indicators before and after the platform's application.

Table 3. Comparison of Business Indicators Before and After the Application of the University Administrative Management Informationization Platform

Metric Name	Before Application	After Application	Improvement Ratio
Recruitment Cycle	30 days	15 days	50%
Personnel Information Accuracy	85%	98%	13%
Reimbursement Approval Time	5 days	1 day	80%
Reimbursement Error Rate	3%	0.50%	83%
Course Selection Processing Time	30 minutes	10 minutes	67%
Academic Data Accuracy	95%	99%	4%

6 Conclusion

The development of the university administrative management informatization platform, set against the Internet Plus backdrop, is a comprehensive endeavor encompassing requirement analysis, system architecture, functional implementation, and rigorous testing. This paper has delineated the construction and practical application of such a platform, integrating key functions like personnel, academic affairs, and financial management, thereby enhancing administrative efficiency and quality significantly. The platform successfully overcomes traditional challenges like information silos and data inaccuracies, supporting informed decision-making in university management. Future efforts will focus on further functional enhancements and broader application domains to advance university management's informatization and intelligence.

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