

Construction and Application of University Graduation System

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Abstract

In the construction of digital campuses in universities, online graduation and departure are important aspects. Implementing the online graduation and departure function for graduates can reduce the complexity of traditional procedures, improve processing efficiency and information dissemination rate, and enhance the level of information management in universities. This article summarizes the construction process and explores the advantages and future optimization directions of online graduation and departure.

Keywords

Graduate, Leaving School, Universities, Digital Campus, Informatization

1. Introduction

With the construction of digital campuses in universities, online graduation has become an important task. In March 2021, the “Notice of the Ministry of Education on Strengthening the Informatization of Education Management in the New Era” was officially released to the public, mentioning the need to use information technology to transform management concepts, improve management efficiency, streamline process links to the greatest extent possible, and shorten processing time [1]. Graduation and leaving school are the final steps of college students’ campus life. Universities should consider the perspective of student users, and information technology should be used to simplify their procedures and improve the satisfaction of graduates.

2. Current Situation Analysis

Most universities have similar graduation and departure situations in the past, and our university has typical representativeness. The graduation and departure procedures involve many departments, such as the Academic Affairs Office, Student

Affairs Office, Finance Office, Network Center, Laboratory and Equipment Management Office, College, Library, Security Office, Logistics and other departments that have close business dealings with students. Previously, the method used was offline processing. After students had obtained the qualifications to graduate, they needed to go to the Employment Center of the Student Affairs Office to obtain a paper graduation approval form, and then go to each department to confirm their procedures. After the procedure is completed, the department administrator will stamp on the form. Only after all stamps are stamped, can students get graduation certificates and other materials.

This kind of process involves multiple steps, which can lead to concentrated business processing time, severe congestion of student queues, and slow overall processing speed. Students spend a lot of time and effort on the process, which can easily lead to negative emotions. Faculty members have to perform mechanical labor such as confirmation and stamping during the processing, and there is no real-time data feedback. Finally, they rely on manual labor to summarize the processing situation of their department, which cannot quickly query and analyze data, and is prone to errors and omissions, seriously deviating from the development of modern management.

The urgent need for graduation and school leaving work is to leverage the efficient advantages of information technology, optimize and standardize the work mode of business departments, achieve data sharing, and improve the efficiency of graduation and school leaving business processing [2], change the current situation of low efficiency, complexity, and complaints from both teachers and students.

3. Construction Idea

Graduation and departure service is a cross departmental task, and the most important thing is to coordinate and plan from top to bottom. Currently, undergraduate students leave school once a year, and graduate students leave school multiple times a year. How to ensure smooth departure procedures for various types of graduates requires collaboration between school leaders and functional departments to do a good job in business sorting and top-level planning [3] [4].

In the informatization construction of universities, some universities have made rapid progress and accumulated a lot of experience that can be learned from. In construction, we should shift from traditional management thinking to governance thinking, service thinking, and user thinking. From the perspective of graduates and managers, consider how to make their operations the most concise and convenient, while ensuring that the business operations and data display of the graduation system are reasonable and smooth. The overall workflow is improved on the basis of complying with actual business needs [5], and can utilize our university's established service hall process platform to achieve customization of departure forms and processes, improving the reuse rate of system construction.

In business operations, it is important to note that graduate students are now allowed to leave school multiple times a year. Therefore, the online process for leaving school should have flexibility by batch, and the processing of each batch should not affect each other. When handling graduation procedures before, there is no order of priority. Now, it is necessary to urge students to handle important departments first based on the importance of money and property. And after the departure processing time starts, graduates do not need to initiate the departure processing application themselves. The system automatically initiates the application for graduates, enhancing the convenience and friendliness of the user experience.

It is important in data display that department managers can pre review the graduation list in advance, only identifying the graduates who need to be processed, and directly marking those who do not need to be processed as passed. The system also needs to integrate data from other business systems, such as the financial arrears situation and book non return status. Based on the above data, the information of all graduation processing departments for graduates will be displayed in a centralized form in the graduation leaving system. There are departments that are exempt from processing and those that need to be processed. This form allows graduates to have a clear understanding of their processing status and achieve targeted and fast processing.

4. Practical Process

4.1. Platform Architecture

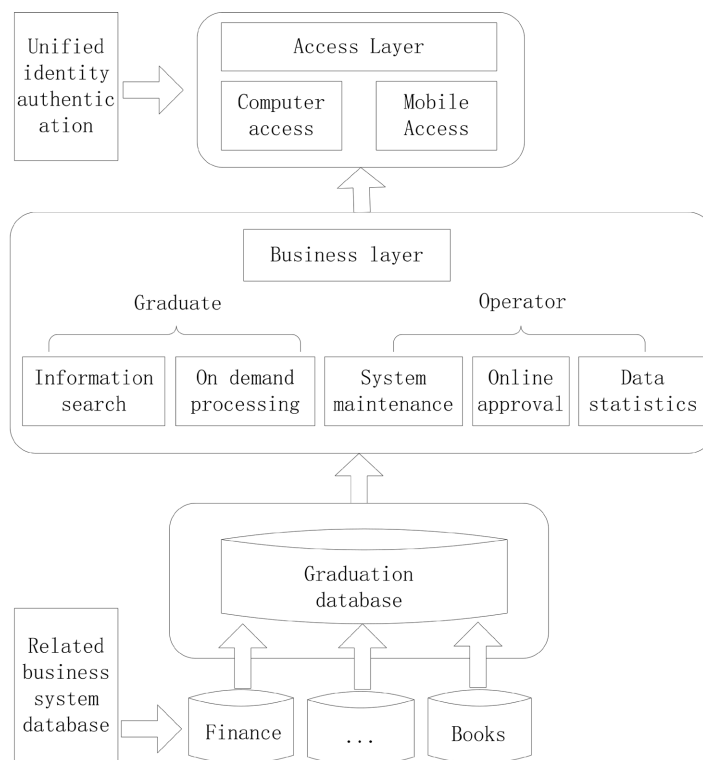


Figure 1. Platform architecture diagram.

According to the common construction mode of information systems, the architecture is implemented in three layers: data layer, business layer, and access layer. The overall platform architecture is shown in **Figure 1** [6]. The data layer runs the school leaving database, which integrates data from related business systems, such as financial expenses, in addition to the data generated by the school leaving system itself. The business layer is the functional implementation part of the school leaving system, which will determine the operation items for each step according to the process design. Specific operation item functions will be programmed and developed based on the requirements document, such as querying the status information of graduation procedures, handling personnel approval and statistics, etc. The access layer controls the access method of personnel accounts. Campus personnel need to pass unified identity authentication and can access the system at any time using a computer or mobile pages.

4.2. Sorting out Business Requirements

There are three key questions that need to be solved in the online process.

1) Sorting out the graduation and leaving process

This requires sorting out the departmental nodes that must be processed for graduation and leaving school procedures, reducing unnecessary departmental nodes such as physical examinations at school hospitals or settling fees for certain laboratories. Based on past experience, graduates generally handle these procedures in advance, and very few of them will process these nodes during the graduation process. Therefore, simplification can be carried out.

In addition, it is necessary to clarify the responsibilities of each department, determine the time and batch of graduation, and straighten out the sequence of graduation procedures [7]. The nodes to be handled are arranged according to the importance of the business. The Finance Department, Experimental Equipment Department, Library Center, and Network Center involving important assets of the university are the priority points to be handled. After these are handled, other points can be handled, such as college, logistics, party and league organization relations, and finally the nodes to receive graduation materials, such as registered residence handled by the Security Department, archives handled by the Employment Center, and certificates received by the Academic Affairs Office. The departments at the same level have a parallel relationship, and students can handle them in any order they want. After processing at that level, student data will automatically flow to the next level. This can guide students in handling procedures according to the actual business process.

2) Graduates can view their personal processing status and contact information of the processing staff

At before graduates need to go to all departments on the paper graduation certificates, and the handling staff will verify and stamp them one by one. Even if graduates do not owe material or fees, they still have to go once, and they do not know who the specific personnel in the department are, resulting in repeated visits

and low processing efficiency. Graduates now need to be able to check which departments have not been processed, where to handle them, who to contact for processing, and how to find them, in order to achieve transparency in business processing, reduce students' running errands, and improve work efficiency.

3) Department managers can quickly query, handle, and compile statistics

Previously, the department's processing personnel would check their own business management system on site after receiving approval forms submitted by students. After verifying that there were no errors, they would stamp the documents. The quantity and speed of processing were entirely based on personal abilities, and there was no quick statistical method for comprehensive situations. They also needed to manually count the completion volume again for work reporting. Now personnel need to be able to easily approve and conduct real-time statistics. If the processing staff goes out, they can also receive timely processing reminders and respond quickly to student needs.

4.3. Functional Realization

1) Database construction

The database is built on the unified data platform of the university, using the Oracle database with good performance. It can withstand the server pressure of centralized processing of departure procedures, has built a regular automatic backup function, and adopts security technologies such as firewall protection and network isolation to ensure data security. Establish table structures such as user tables, permission tables, system management tables, and process status tables based on business functions, which are used to circulate and store the content of each function. In addition, the data of relevant business systems for graduates is integrated through data synchronization and written into the data table for handling matters for graduates. For example, the financial system offers information such as student ID, name, whether there are arrears, and the amount of arrears. The book system offers information such as student ID, name, and whether there are owed books. So that various types of data can be displayed uniformly on the graduation system page.

2) Development of business menu function

Program development adopts the mature JAVA language and its related frameworks, with stable technology and high scalability. The graduation and departure system mainly includes menu modules such as system settings, data import, pre-processing, individual approval, query statistics, student queries, and message reminders. The corresponding diagram of the sorted process and functions is shown in **Figure 2**. After program development, in addition to testing functionality to meet requirements, vulnerability scanning tools will also be used for inspection to ensure the security of the program, so that it can run stably for a long time.

- System settings

The main task is to configure the system process, which includes graduation batch management, department nodes management, personnel account permis-

sion management, process start time setting, process point processing sequence and form style configuration.

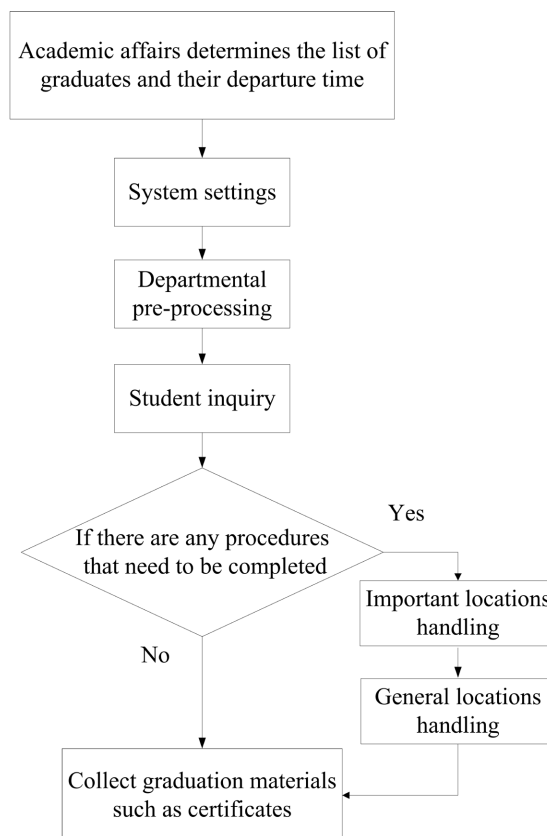


Figure 2. Process design diagram.

- Data maintenance

The list of graduates is provided by the student registration management department and imported into the graduation batch label of the graduation system by the system administrator. The batch label is generally defined by the keywords of students' level and year/month/day. In the future, graduate data can be processed in batches according to the label name. Administrators can also update financial, library, and other business system data to the school leaving database through data synchronization. The system will automatically determine the department nodes status of graduates based on the synchronized information, and students who do not owe fees or books will be automatically marked as exempt from processing. The system can also import the contact information of the handler into the corresponding form and display it, making maintenance very convenient.

- Preprocessing

The department handler checks the list of graduates in this batch from the system and marks the status of graduates based on the business situation of the department, whether they need to be processed or exempted. After this step, the

procedural status of graduates has been distinguished, so graduates who are exempt from processing do not need to pay attention to this department, only need to focus on the department nodes that need to be processed, saving a lot of time and energy.

- Single approval

After pre-processing by the department handler, students can log in to the system to check the status of their personal electronic departure form and go to the required nodes to complete the procedures. There are prompt messages on the form, and students can also contact the processing staff to inquire about their situation. Most transactions can be resolved on their own, and the processing staff can approve them online. Only a few cases need to be handled offline.

- Query statistics

The graduation and departure system has established a graduate status statistics table and a department processing statistics table. The graduate status statistics table can view the processing status of each graduate at various department locations. It can be used by students or their counselors to check their graduation progress. The departmental processing statistics table can query the processing percentage and student details of each department, which can help the processing staff further assist students who are lagging behind in processing.

- Student inquiry

Students can check their personal processing status at any time through the system website on the computer or the university WeChat service on the mobile phone. The form contains information about all department nodes, such as department name, handler name, handler phone number, handler office address, other reminder information, and the approval status of the processing point. Generally, they can handle it themselves according to the prompts and then contact the handler for approval. After the final completion of all procedures, graduation materials can be collected.

- Message reminder

The school leaving system relies on the message platform of our university's online service hall, which provides mobile reminders for both pending and completed affairs. This enables both the staff and graduates to receive timely information and handle affairs through their mobile devices, achieving real-time response and timely processing.

5. Achievements and Explorations

Since the operation of the graduation and departure system, the staff of each department can pre identify the status of students' school leaving procedures, avoiding a large number of students coming to their office for processing. They can also view and summarize the school leaving data of their department in real time. Students can also quickly check the status of their procedures in various departments and only go to the department where they need to complete the procedures. The overall work efficiency has increased, and after optimizing the process, the steps

have become very simple and the operation is also very easy. The pressure on teachers and students has been greatly reduced, and there is no longer a phenomenon of queuing for processing in various departments. After multiple optimizations and adjustments, based on the graduation data in June 2024, within the batch processing cycle (usually around 10 days), there are a total of 15 departure nodes in the university, about 50% of the nodes have a completion rate of 100%, and the average completion rate of the remaining nodes is over 98%, achieving outstanding results. And the entire process is traceable, providing data basis for the university management. During the process of handling the procedures for leaving school, on-site research was also conducted on some staff and graduating students, and they all expressed satisfaction with the current processing status.

There are also some issues reflected in the current system operation, such as the list of students who have left university after completing all procedures cannot be synchronized and updated in the student registration management system, and the closed-loop management of data has not been achieved. The statistical query function of administrators is not yet complex enough to form cross statistics with multiple batches and conditions. Moreover, the refund of overpaid fees to graduates has not yet been automated, and it still requires manual calculation of various expenses before submitting them to the finance department for a unified refund. All of these need to strengthen the interaction between information systems in the future, better achieve data sharing in all aspects, enhance global service awareness, and achieve efficient governance and services [8].

6. Summarize

In today's rapidly developing information society, improving the level of educational information management means enhancing the overall level of office work. The establishment and application of the graduation and school leaving system, from the perspective of campus business and users, using a single graduation form for presentation and approval, has achieved orderly processing of various departments' business [9], which has been recognized by relevant departments and graduates. This indicates that the university has improved its service level by using information technology and achieved the educational concept of being people-oriented. In the future, it will be able to better walk the path of educational modernization.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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