

Research and Design of Campus Bus Reservation System based on WeChat Mini-program

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Abstract

How to reasonably solve the commuting problem of the majority of teaching staff is very important for the logistics management of colleges and universities. Through the means of information technology, scientific and efficient management of school logistics will help to improve the efficiency and quality of logistics management. This paper studies and designs the teaching staff bus reservation system based on WeChat Mini-Program, so that the bus can meet the needs of the teaching staff commuting on the basis of normal operation, reduce the waste of resources, and make the school bus management enter the era of information and science.

Keywords

Campus Bus; Reservation System; Mobile Terminal; Mini-program.

1. Introduction

Now we are in the information age, the information technology of modern society is highly developed, how to use information technology to coordinate the completion of daily work has become more and more practical significance. [1] Aiming at the problems of school bus operation in Colleges and universities, with the help of intelligent and scientific management means and the work of logistics management department in Colleges and universities, the school bus operation situation can be greatly improved. In recent years, more and more network-based information systems have been designed and applied to the school bus management in Colleges and universities, which makes the traditional school bus management methods gradually replaced. On the one hand, it reduces the daily workload of logistics personnel in Colleges and universities, improves the efficiency and quality of logistics services, and on the other hand, it also helps to effectively improve the scientific and standardized level of school bus management in Colleges and universities.

In order to improve the operation of University bus, especially to improve the ride experience of university staff, we study and design the bus reservation system based on WeChat Mini-Program. WeChat Mini-Program is an application that can be used without downloading and installing. Users can open the application by scanning or searching[2]. The system provides users with line query, seat reservation, online vehicle reservation and other services.

2. Research and Design of the System

By collecting the travel demand in advance, the campus bus reservation system effectively defines the main body of the bus, plans the optimal driving route in real time according to the reservation time and the reservation stop, and finally arranges the bus frequency reasonably, so as to fully use the school transport capacity to improve the efficiency of vehicle use and management. In the long run, on the one hand, the application of the faculty bus reservation system is conducive to improving the satisfaction of the staff group to the teaching work and living environment. On the other hand, if the

application is carried out in the intensive education area of universities such as the University Town, it can better realize the complementary communication resources between universities, which is conducive to the teaching friendship between universities.

2.1 Overall Design

The school bus management and appointment system is divided into six functional modules: personnel information management, vehicle information management, line management, bus reservation management, bus scheduling management and system comprehensive management. The administrator is responsible for the management of personnel information, and unified management of system user information includes staff information, team leader information and driver information. The vehicle information management is also responsible by the administrator, which is specifically divided into vehicle basic information management and vehicle operation data management. The team leader and driver complete the information reporting according to the specific vehicle tasks. The line management of the bus is divided into line operation management, line audit management and line task management, and is participated by the administrator, team leader and office leader. The reservation management of the bus is divided into appointment operation management, appointment task management and personal appointment management, which is participated by the administrator, team leader and teaching staff. The management of the bus dispatching is divided into dispatching operation management, scheduling task management and personal dispatching application management, which is participated by the administrators, team leaders, drivers and teaching staff. The system comprehensive management is divided into fleet administration, fleet financial management and fleet operation management, which is participated by the office leader, financial department and team leader.

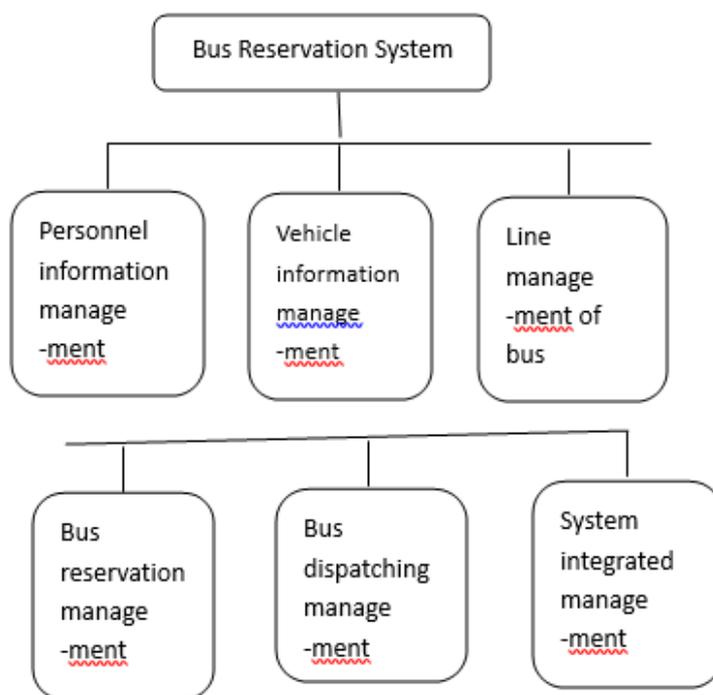


Figure 1. Function Module Diagram of Bus Reservation System

2.2 Detailed Design of Function

2.2.1 Personnel Information Management Module

1. Administrator: the Commissioner of school bus management office, who is responsible for the specific tasks of vehicle operation, including personnel information management, vehicle information

management, bus route management, bus allocation management, bus reservation management, bus scheduling management, etc., and acts as the coordinator to follow up the road traffic conditions in real time during the driving process, so as to provide necessary help.

2. Team leader: responsible for checking and counting the daily driver status and vehicle operation, and reporting them regularly.

3. Driver: responsible for receiving and completing the driving task, and reporting to the team leader.

4. Staff: confirm that the staff who need to make an appointment are allowed to take the bus on campus as passengers.

5. Financial department: together with the school bus management office, responsible for the cost accounting of vehicle operation, the payment of driver's allowance, the fund allocation of vehicle maintenance, etc.

6. Office leader: responsible for quality control, review and approval, review and report, such as managing the performance appraisal of drivers, handling the changes of work content requested by the team, reviewing the financial status of the team operation, etc.

2.2.2 Bus Information Management Module

The vehicle information management mainly analyzes the business process of collaborative management of vehicle information by administrators, team leaders and drivers. Firstly, the administrator logs in to the vehicle management interface to check whether the vehicle information is perfect and effective. If it needs to be improved, the team leader is informed to locate the problem vehicle and assign the vehicle inspection task to the driver. Drivers carry out vehicle inspection and improve vehicle information in time, and report to the administrator after summary and integration. This management process can ensure the safety of vehicle assets to a certain extent. After confirming that the basic information of the vehicle is correct, the administrator will check the vehicle operation data. If the data information is out of date, the administrator will inform the team leader to locate the responsible driver and convey the data update requirements. The driver updates and reports the operation data to the administrator after receiving the notice. After the administrator confirms that the operation data is updated correctly, the vehicle information document is generated by statistical integration of relevant data and entered into the system for filing.

2.2.3 Bus Line Management Module

Bus line management mainly analyzes the business process of three types of personnel including administrator, team leader and office leader participating in bus line management. First of all, the administrator logs in the line management interface and finds the specific line according to the line code. If the query fails, it indicates that the working line needs to be added and improved, and then the next step is to inform the team leader to plan the relevant vehicle operation line and report the line information. If the checked line exists, the administrator decides whether to change the parameter setting of the existing operation line, such as the addition of stops. If the line setting is changed, the team leader will be informed to update the information synchronously and report the new line information. If the line setting is not changed, the line operation data will be updated. Then the line adjustment information will be summarized and reported to the relevant office leadership for review. If the review is passed, the administrator will send the line information. If it fails to pass the audit, the line information needs to be readjusted and submitted again for audit before it can be saved and uploaded to the system.

2.2.4 Bus Reservation Management Module

The bus reservation management module mainly analyzes the business process of the staff, administrators and team leaders who participate in the bus reservation management. First of all, the staff log in to the personal appointment account to query the personal appointment credit score. If the credit score is not up to the standard, they cannot use the shuttle bus appointment service. They need to wait for the credit score to recover naturally before they can use the shuttle bus appointment service. If the credit score is up to the standard, they can fill in and upload the appointment registration form.

The administrator checks whether the appointment information is perfect, and if the appointment information is confirmed. If it is good, the registration form will be summarized and integrated, otherwise it needs to be filled in and uploaded again. The administrator will copy the summarized booking registration form to the person in charge of the team. After integrating the booking conditions, the person in charge of the team will assign the task. If the assignment fails, it needs to be reassigned. If the assignment is successful, it will be fed back to the management office to generate the booking record. According to the appointment record, the administrator feeds back the appointment result to the staff and checks the appointment execution result of the staff, so as to adjust the credit score in the appointment account accordingly.

2.2.5 Bus Dispatching Management Module

The bus dispatching management module mainly analyzes the business process of four types of staff, administrators, team leaders and drivers participating in the bus dispatching management. First of all, the staff explain the reason of the application after putting forward the dispatching application, and then upload and submit it to the administrator. After the administrator's approval, they file and accept the dispatching application. If the application is rejected, they need to explain the reason of the application again. The administrator informs the team to execute the dispatching according to the accepted dispatching application, and the team leader makes the dispatching arrangement after receiving the dispatching notice. If the driver has objection to the dispatching arrangement, it needs to reschedule the dispatching. If the driver receives the dispatching arrangement, the team leader submits the dispatching information to the administrator, and the administrator generates the dispatching record according to it and feeds back the dispatching result to the staff.

2.2.6 System Integrated Management Module

The system integrated management module mainly analyzes the business process of the team leader, office leader and finance department. First of all, the person in charge of the fleet collects the fleet operation data, and then reports the operation profile to the relevant office leadership. Then, the leader of the office analyzes and copies the general situation of the fleet management to the financial department, and entrusts it to handle the specific matters such as the payment of the fleet performance allowance and the change of the vehicle asset registration. Then, the financial department summarizes and feeds back the financial situation of the fleet to the leader of the office, and the leader of the office adjusts the vehicle operation management according to the actual situation, and then generates the comprehensive report of the school bus management and reports the work to the superior department.

3. System Implementation

The campus bus reservation system mainly relies on mobile Internet technology, and provides various services based on WeChat Mini-Program. Users can access the system through mobile devices to realize the functions of bus line query and bus online reservation[3].

The data interaction between the front end of WeChat Mini-Program and the server is one of the important basic work for the development of the applet. We use Web Service technology to operate the database and return the processing results[4].

WeChat applet integrates HTML, CSS, JS and other front-end technologies. Visual studio 2013 is used as the integrated development environment for the development of background functions[5]. The programming language is C#. MySQL, an open-source relational database management system, is adopted for the database.

4. Conclusion

The campus bus reservation system based on WeChat Mini-Program is a typical application of information system. With the help of information technology to help college logistics management, it will greatly improve the work quality and efficiency of logistics department. This paper studies and designs the campus bus reservation system for the staff in the university logistics service object,

which can greatly improve the management efficiency, improve the workload of the vehicle management department, and provide convenience for teachers and students, managers and senior management.

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