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The Design of Student Training System of Ethnic Minorities in Jiangxi Universities Based on Big Data

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Abstract: With the rapid development of science and technology and the networking of information, it is a trend for culture to develop in the direction of diversification. College students come from all over the world, there must be a variety of ethnic groups, ethnic minorities in diet and clothing with the Han nationality has obvious differences, how to protect the cultural differences of ethnic minorities in Colleges and universities without affecting learning has become a problem. The purpose of this paper is to take Jiangxi universities as an example to study the student training system under the diversified interaction, so that students of the same ethnic group can communicate more easily and different ethnic groups can get along well. This topic first carries on the comprehensive investigation to the school's community organization, student's scientific and technological innovation and social practice, grasps the various materials needed, and paves the way for the establishment of the follow-up database. It uses the visual programming software Delphi and the simple and practical database software access to complete the programming design of the main interface of the program and the program design of the link with the database. Through the test, it is found that the system has met the needs of users and passed three functional tests, namely the main function test of system login interface, the main function test of system user management, the main function test of community activity management. Successfully completed the design and implementation of the management system for the cultivation of College Students' comprehensive quality and ability; it greatly facilitates the work of the Youth League Committee and improves the work efficiency.

1. Introduction

With the continuous globalization of economy, driven by the rapid development of science and

technology and the trend of information networking, culture has begun to go out of the original closed area and expand to the world [1-2]. Culture is developing in the direction of diversification, which has become an inevitable trend and an objective fact [3-4]. However, an obvious disadvantage in China is that in the education and training of excellent students in ethnic minority areas, comprehensive colleges and universities do not fully take into account the historical and Cultural Deviation of excellent students in ethnic minority areas, but combine them with excellent students in ethnic minority and Han areas through a unified training method, and cultivate them in the same way [5-6].

On the design of student training system, many scholars have their own research [7-8]. For example, some scholars based on J2EE platform, applied EOS development process, adopted B / s development mode, and used MySQL database to design, analyze, implement and test the student training management in Colleges and universities [9]. In addition, combined with the causal feedback loop analysis method, modeling and simulation method of system dynamics, other scholars analyzed the system structure of professional degree postgraduate training mode in China, established the system dynamics model and simulated the operation mode of the system structure [10].

This topic first carries on the comprehensive investigation to the school's social organizations, students' scientific and technological innovation and social practice, grasps the required information, and paves the way for the establishment of the follow-up database. It uses the visual programming software Delphi and the simple and practical database software access to complete the programming design of the main interface of the program and the program design of the link with the database [11]. Specifically, access completes the design of various data tables used in this system. Finally, it will use the main program to call the database to realize the connection between program and data, and establish the management system for the cultivation of College Students' comprehensive quality and ability [12].

2. The Research of Student Training System

2.1. Introduction of Application Technology

The design of this system mainly adopts the visual programming software Delphi and the simple and practical database software access. Delphi software mainly completes the programming design of the main interface of the program and the program design of the link with the database. Access completes the design of all kinds of data tables used in this system. Finally, the main program will be used to call the database to realize the connection between the program and the data, and establish the student training management system of Jiangxi University under the diversified interaction.

2.1.1. Delphi Technology

Delphi has the characteristics of easy to learn and powerful functionality, which will greatly improve the efficiency. More importantly, program developers do not necessarily have the basic knowledge of C programming or C + + programming. Developers can develop a series of application software systems in a fast and efficient way in Delphi environment. These application software systems are based on Windows environment, using event driven programming mechanism and easy-to-use visual design tools to realize functions and display graphical interfaces. Delphi has the characteristics of visual programming, object-oriented, structured programming and event

driven programming.

2.1.2. Access Technology

Access is a relational database management system, friendly interface, easy to operate, scalable, so the system chooses it to build a database.

2.2. Key Technologies of Big Data Processing

It is necessary to analyze the credibility of the collected data when designing the student training system. The credibility of data largely depends on the credibility of the data source that publishes the data. In addition, because the credibility of different data sources is not the same, two factors must be considered when calculating the credibility of data: the credibility between data sources and the credibility of data sources.

2.2.1. Credibility Calculation Model

There are mainly two kinds of credibility calculation models applied in social networks, one of which is derived from the dynamic model of P2P network and a static credibility model combined with its own characteristics. The other model is dynamic trust model, which calculates the trust value through continuous interaction feedback, so the trust value changes with the interaction record.

2.2.2. General Method of Credibility Calculation

At present, there are two commonly used methods to calculate the degree of trust: Bayesian estimation and maximum likelihood estimation. According to the service evaluation set of interaction records, the parameters to be evaluated can obey the two distributions of Dirichlet and beta. When the evaluation results are not binary, the Dirichlet distribution is adopted, as shown in formula (1).

$$\mathrm{f(p,m,k)} = \frac{1}{\int_0^1 \prod_{i=1}^k x^{(m_i+Clk-1)} dx} \prod_{i=1}^k x^{m_i+Clk-1} dx \tag{1}$$

The expectation of parameter P in the evaluation results needs to be adjusted by constant C, and the expectation of P increases with the decrease of constant C. At present, in most studies, C is K. The probability of service evaluation result in I is expressed by Bayes expectation, and the specific formula is shown in equation (2).

$$\mathrm{E}(p_i) = \frac{m_i+Clk}{C+\sum_{i=1}^k m_i} \tag{2}$$

When the evaluation result is binary, the Dirichlet distribution becomes beta distribution. The trust algorithm based on Bayesian network is relatively easy, and the credibility of nodes is calculated by beta probability density distribution. Bayesian network credibility algorithm is complex, complicated and difficult to understand, but it is also the basic theory of entity credibility value calculation.

3. Design and Implementation of Student Training System

3.1. System Design Objectives

The management system of College Students' comprehensive quality and ability training integrates the mixed information, reflects the data completely in the system, makes the management transparent and reasonable, mobilizes all students, actively improves the management of ability training, makes the management information, and improves the management efficiency. The design goal of this system is convenient maintenance, systematic management, high availability, strong scalability, simple operation, and the system supports data backup.

3.2. System Structure Design

Based on Delphi platform and access database software, the management information system of College Students' comprehensive quality is developed with Object Pascal language. In the design of the system, first of all, according to the requirements of Jiangxi universities for the training and management of College Students' comprehensive quality and ability in minority areas, this paper analyzes the training and management mode, methods and processes of college students in minority areas, and collects relevant first-hand information, the overall goal and main function requirements of the construction of the management information system of College Students' comprehensive quality and ability training in minority areas are determined. When the system is put into use, there is a lot of data access, so we need a set of special database server to strengthen its application ability, so as to improve the execution efficiency of the system. Then, after studying and establishing the overall objectives and functional requirements of the system, the overall design scheme of the management system is given, the overall design principles of the system are put forward, the server operating system and database management system are selected, the development tools and software development environment are selected, and each functional module and the design flow chart of the system are designed according to the actual situation. Then in the development process of the whole system, the corresponding functions of each functional module are completed, so as to complete the objectives and functional requirements of the whole system. Finally, the function and performance of the system are tested.

3.3. System Function Module Design

This system needs to conduct a comprehensive survey of the school's community organizations, students' scientific and technological innovation and social practice, master the required information, and pave the way for the establishment of the follow-up database. The design of this system adopts visual programming software Delphi and simple and practical database software access. Delphi software mainly completes the programming design of the main interface of the program and the programming of the link with the database. Access completes the design of various data tables used in the system. Finally, the database will be called by the main program to realize the connection between the program and data, and the comprehensive quality ability training management system of college students will be established. This system module is mainly divided into community management module, student science and technology innovation module, student social practice module. The community management module is to manage the communities established according to the traditional culture of ethnic minorities. Students' scientific and technological innovation module is an innovative activity of ethnic minority students based on their own interests and

hobbies. Students' social practice is to let minority students and Han students volunteer activities, rural activities and other practical activities.

3.4. System Database Design

Database design technology is the best means of current information resource management. It is to map the information involved in the system to the database and design the database logically. In general, collect and sort out some data according to the needs of users, analyze and find out the internal correlation, understand the format of various kinds of information, and then design the E-R diagram that can reflect the correct logical correlation through the built-in analysis tools of the database management system.

3.4.1. Conceptual Structure Design of Database

The objects that the college needs to manage in the student training system are various societies, scientific and technological innovation works and social practice activities. Before design, we need to use E-R diagram to describe entities and attributes, and distinguish different concepts. There are six attributes of club member management, which are name, gender, Department, nationality, specialty and club. There are six attributes of the work of the science and technology competition platform, which are the number of the work, the name of the work, the category of the activity, the way of declaration, the content of the work and the attachment of the content. There are seven attributes of daily social practice activities, which are activity number, activity theme, activity start time, activity end time, activity location, activity content and attachment.

3.4.2. Logical Structure Design of Database

After the completion of the database structure design, according to the E-R diagram, the second stage of logical structure design is to transform the E-R data model into relational table. For example: as shown in the table is the user information table, which clearly records the basic situation of students, and can achieve efficient and unified management.

Table 1. User information table

Field name	data type	Data length
St_ID	auto number	50
Name	text	20
nation	text	50
Gender	text	10
Department	text	50
major	text	10
Association	text	50

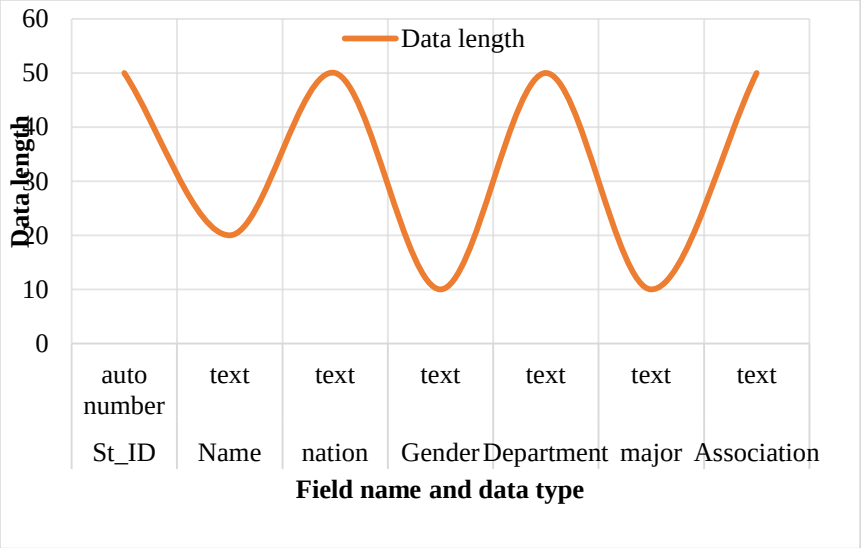

Figure 1. User information Chart

As shown in Figure 1, the E-R diagram is converted into the corresponding diagram of the relational table. From the diagram, it can be clearly seen that the data length of each field name changes in a wavy shape, which is the data length of most fields.

4. System Test

4.1. System Test Objectives

System test is a test for the whole system. It is a development step that each management information system must complete before running. It is to determine whether the system can reasonably control the confirmed software, hardware, network and other elements, and provide users with stable and safe services. The purpose is to test whether the system meets the needs of the system and eliminate potential errors, In order to put forward a more perfect scheme, give users a high quality software system.

4.2. System Test Environment

4.2.1. Hardware Environment

Network equipment environment of Jiangxi Provincial Education Bureau

4.2.2. Software Environment

The software environment is divided into two parts: server and client. In the server software environment, the windows 2003 server operating system, iis6.0 network server and access database management system are adopted. The program position is under disk D of the quality and ability training management system of college students of Sichuan Water Conservancy Vocational and technical college. The client software operating system adopts Windows XP system, and the browser is IE6.0 and above.

4.3. System Function Test

4.3.1. Test Steps

To ensure the validity of the test, delete the cache records and cookies records and other temporary files in advance. Then install and start web application stress, and a create new script dialog box will be opened when the program runs, which will then create a new script window. If you run the software and find that the window is not open, click the button new script on the main program window toolbar. At this time, the status bar of the browser displays "complete", indicating that the test is completed, the recording script function is normal, and the information updated in real time during script recording is displayed. Finally, the static interference elimination function of the test software is directly deleted from the main menu of the setup.

4.4. System Performance Test

This test realizes the performance test of configuration, response time, pressure, capacity, security, recovery, backup and so on, and the results are quite good. 5, 4, 3, 2 and 1 are used to grade the test performance, and from small to large, it means from bad to good. The system performance test report is shown in Table 2.

Table 2. System performance test report

Test content	test result
Configuration test	5
Response time test	2
Stress testing	5
Capacity test	5
Security testing	5
Recovery test	4
Backup test	4

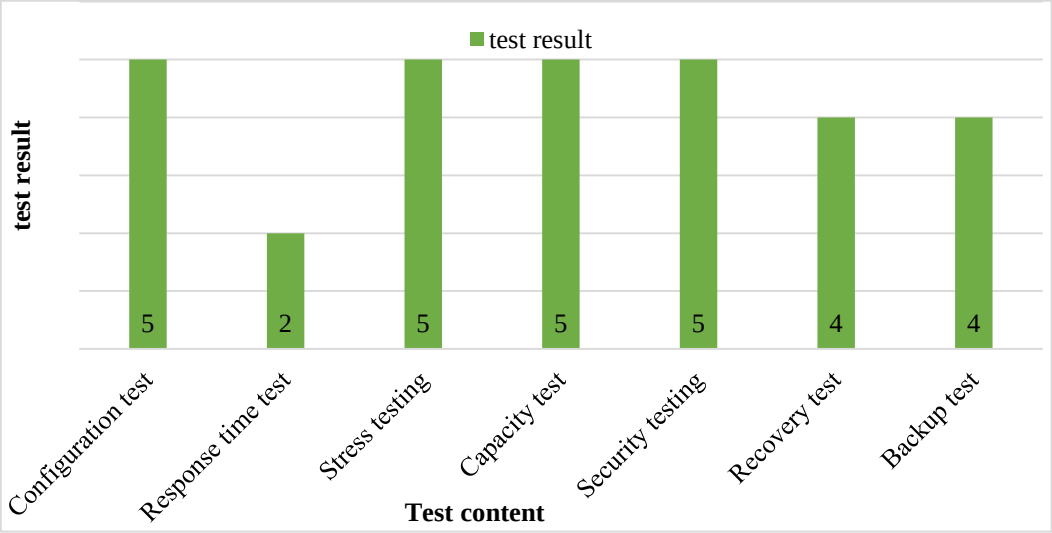

Figure 2. System performance test report

It can be seen from Figure 2 that most of the five tests have higher scores, which shows that the

system has better performance.

4.5. Test Results

According to the above analysis and test, the results show that the management system has met the needs of users; through the following three functional tests, we have successfully completed the design and implementation of the management system for the cultivation of College Students' comprehensive quality and ability; It greatly facilitates the work of the Youth League Committee and improves the work efficiency.

5. Conclusion

In this paper, Delphi and database software access are combined to complete the comprehensive management of Jiangxi University associations, scientific and technological innovation activities, and college students' social practice activities, so as to simplify the complicated and chaotic affairs of student organizations, and improve the efficiency of teachers and the enthusiasm of students' activities. First of all, this paper expounds the investigation and analysis of the current situation of colleges and universities in Jiangxi Province. Based on the survey results, this paper expounds the main contents of the cultivation of College Students' comprehensive quality and ability, summarizes the workflow and functions of the whole system, and formulates the preliminary system requirements; then, according to the needs of the design system architecture, through a lot of coding work, to achieve the system, the establishment of four modules are: information export and import module, system management module, human-computer interface module and quality training module, and then the user registration, news update, front desk management, activity application, community innovation message and other basic functions are built into four modules, which is convenient for users to quickly master the use of the system; finally, this paper describes the black and white box test method to test and check the operation of the system program, to ensure the quality of the system, and then through the user experience and feedback to evaluate the practicability of the system.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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