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Analysis and Design of the Innovation and Entrepreneurship Training Management System based on School Enterprise Cooperation (Taking the School of Computer and Information Engineering of Beijing University of Agriculture as an example)

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Abstract. With the promotion of undergraduate training mode of "3+1" in Beijing University of Agriculture, the mode and direction of applied and compound talents training should be further visualized, at the same time, in order to make up for the shortage of Double Teachers in the school and the lack of teaching cases that cover the advanced technology in the industry, the school actively encourages the cooperation between the two teaching units and enterprises, and closely connects the enterprise resources with the school teaching system, using the "1" in "3+1" to carry out innovative training work for students. This method is beneficial for college students to integrate theory into practice and realize the purpose of applying knowledge in Higher Education. However, in the actual student training management, this kind of cooperation involves three party units and personnel, so it is difficult to form a unified management, on the other hand, it may also result from poor communication, which leads to unsatisfactory training results. At the same time, there is no good training supervision mechanism, causes the student training work specious. To solve the above problem, this paper designs a training management system of student innovation and Entrepreneurship Based on school enterprise cooperation, the system can effectively manage the relevant work of students' training, and effectively solve the above problems. The subject is based on the training of innovation and entrepreneurship in the school of computer and information engineering of Beijing University of Agriculture. The system software architecture is designed using B/S architecture technology, the system is divided into three layers, the application of logic layer includes student training management related business, and realized the user's basic operation management for student training, users can not only realize the basic information management of enterprises, colleges and students through the system, at the same time, it also realizes the information operation of student training management [1]. The data layer of the system creates database applications through Mysql technology, and provides data storage for the whole system.

1. Research significance

Beijing University of Agriculture is a cultivation of Applied Talents in University of Beijing, the school attaches great importance to the cultivation of students' practical skills and innovation ability, the "3+1" training system, it is very important to the students during the school training last year internship, which is directly related to the realization of the school for the industry of Beijing city culture "use, applied talents stay". So the school to promote cooperation, to build a "undergraduate innovation training base", through the introduction of "double" teachers, teaching resources and realize



the integration of enterprise, deepen the content of personnel training, broaden employment channels for students to. Since 2015, School of computer and information engineering has been carrying out the school enterprise training and training base with famous enterprises such as Neusoft group, soft group and An Bo group, and achieved gratifying results. But in practice a lot of difficulties, such as the number of students, teaching content is complex, before the school take the traditional manual management mode, this means a lot of drawbacks, first of all, the three party enterprise school, students cannot do effective communication, information cannot be timely communication, but also because of a variety of human factors on practice progress, leading to efficiency low practice, low interest student practice a series of drawbacks. For the modern student internship management system, these drawbacks must be overcome. Therefore, it is urgent to establish a "college student's innovative training management system", and realize the concise, efficient and scientific management of the training work [2]. According to the problems mentioned above, combined with the specific situation of the school of computer and information engineering of Beijing University of Agriculture, the design of a complete student internship management system is the best solution to the above problems.

This paper designs a set of cooperative base students training management system, the system responsible for related information entry, preservation and management practice and innovation of various aspects of the final synthesis of simple and intuitive the chart information. At the same time, when designing the system, we also consider that the system must have great flexibility and flexibility. Because each intern for six months or a year, basically have to change a student information, along with the development of computer and Information Engineering College internship policy adjustment, the number of interns are more and more, will increase the workload of the system, increase the operating pressure. Only the establishment of students' innovation and Entrepreneurship Management System of scientific and effective, can effectively improve the efficiency of practice management, reduce management costs, and fundamentally change the status quo, the school students of the three together, let the teachers perform better supervision, increase the teachers and students to communicate, at the same time, internships can also better to understand the situation of students, improve the training effect to a new height [3].

2. Demand analysis

2.1. Business requirements analysis

The main purpose of the training system of student enterprise cooperation base is to provide a better training platform for students. In this system, we can query the emphasis of teaching and learning at the knowledge level at any time. It can improve the learners' practical ability and improve the quality of College education. For cooperative enterprises, it can also promote communication and gain benefits. The system achieves win-win results through the cooperation of schools and enterprises.

In accordance with the normal teaching arrangements to guide student's innovation and entrepreneurship training work, when teaching service cooperative enterprises have additional requirements, can apply to the school teaching guidance committee, make appropriate adjustment.

The whole sequence of 2.1.2 process is completed in the College Teaching Guidance Committee under the guidance of the training before the start of training the students by establishing the direction of College Teaching Guidance Committee, students enter the school enterprise joint training base, you can choose the training direction, then in accordance with the instructor and training required to complete the training task, training manuals, final submission training and training report appraisal table of materials can be calculated in practice performance to the college [4].

The main form of 2.1.3 students' training is the form of collective organization, and the overall principle is to closely link the actual training with the training of skills.

To school designated enterprise training students to sign the training agreement and acceptance of two-way student training enterprise agreement should negotiate the responsibilities of both parties, rights and obligations, working conditions, working time, labor conditions, and health insurance and other issues, and meet the requirements of labor law rules and regulations.

Assisted undergraduate and graduate students in completing the task of innovation and entrepreneurship. School of innovation and entrepreneurship guidance team in this platform, according

to the demand for the construction of innovation and entrepreneurship training system innovation resources, MOOC released a variety of innovative entrepreneurial activities and lectures online information, so as to realize the innovation of teaching.

Achieve online management of innovation and entrepreneurship teams. The school also need to innovation and entrepreneurship project audit, each team needs to fill in the "innovation platform for innovation and entrepreneurship in the project application form", the school online review of the project, the final release of the audit opinion, and according to the results of the audit office and other office resource allocation. In the process of project development, the system will record the progress of each project; after the project is completed, the innovation and entrepreneurship team will be required to complete the project acceptance according to the requirements of the Institute, and the results will be publicized on the platform.

College will be released according to the actual need, at all levels of innovation and entrepreneurship competition and discipline competition in information platform, encourage students to actively participating students according to the enrollment situation, to contest the organization and training work [5].

2.2. functional requirements analysis

2.2.1. Administrator module. The most basic role of the administrator module is the administrator. The specific work includes the administrator user information management, department management, class information management and enterprise information management not only that, the system administrator also relates to the implementation of the plan of training management, training management and system management announcement. The aspects of its management are as follows:

2.2.1.1. User information management. The user information management mainly includes the teacher who undertakes the training instruction task

Refers to the teachers who undertake this training task, add, delete, change, check and so on. Student personal information, student training data management is also part of the user information management system. This function is mainly to facilitate the training team leader, understand the specific situation of students to participate in training, you can see each student's training data. When both the school and enterprise teaching leaders need to understand the professional situation of students, they can search the corresponding training direction through the system.

2.2.1.2. Department management. The system provides the management function of two levels of information about the hospital and department. When the information is changed, it needs to be updated in a timely manner. This process includes the work of increasing, deleting, modifying and checking the information of hospitals and departments. The reason is that the basic information of the college and department and the requirements for the training position are always changing.

2.2.1.3. Student training management. Student training management system is an important part of the system. Administrators can manage students through the system training process, and some basic operations include: add, delete, print, search and so on. Students can choose from the system for their own training direction, the administrator will be based on the college teaching steering committee approval results for operation.

2.2.1.4. Information release management. Information management is for the convenience of all personnel involved in the training work in time to see the latest training information, policies related to the latest release of new entrepreneurial activities and competition information, entrepreneurial projects, venture capital support and school.

2.2.2. College teaching steering committee management module

The management of college teaching guidance committee mainly includes the inquiry and statistics of training situation, the direction of training, the arrangement of training work schedule and the overall arrangement of related resources of college innovation and entrepreneurship.

On the one hand, we should arrange the work on campus, and on the other hand, we should contact the enterprises outside the campus.

2.2.2.1. The student Instruction Committee account login module. The College Teaching Steering Committee has a higher level of account and requires higher authority. It is authorized by the administrator. For the sake of security, the college should assign a special person to

2.2.2.2. Arrangement module of training work. The purpose of this module is to effectively evaluate the quality of training and to distribute the teachers' strength both inside and outside the school. The first has been identified in the premise of the students under the direction of the training (has been teaching guidance committee approval), a reasonable allocation of school teachers, so each student has fixed the guidance of teachers, to guide the students' training work. After the internship, the instructor will give the results according to the training report submitted by the students, and give the evaluation and scoring according to the students' performance in the process of training.

2.2.2.3. Innovation and entrepreneurship guidance module. Institute for review in the declaration of this, master students of grade two innovative entrepreneurial team project innovation, according to the content and project budget, the hardware and software environment to ultimately determine the funding support and carry out the work needed to support.

2.2.3. Faculty functions within the school

The school guidance teacher needs to review the student's training plan, training suggestions and requirements, including safety education, etc.. The school guidance teacher login to the system, modify personal information, and communicate with students, after the training, also need to work with students to complete training guidance records and training reports. Finally, the training opinions and evaluation results are given.

2.2.3.1. Login module. The school teacher completes the registration process of the system account. The user name of the account number is the teacher worker number. After entering the login screen, the tutor can change personal information.

2.2.3.2. Problem communication module. Problem communication is a platform for students and teachers to communicate with each other. Through this platform will put forward their own problems, the teacher regularly browses this, read the students' message, if the problem can be solved, by the teacher contact students to solve the problem. If the problem is beyond the scope of the teacher's competence, he may respond to the steering committee of the hospital and give him a final answer. Through this module to record the problems encountered in the training process and the methods to solve these problems, which will play an important role in improving the quality of training.

2.2.3.3. Assessment results. After completing the training, students need to submit relevant materials, including training content, purpose and experience, etc.. On the basis of the performance of students during the enterprise internship, the teachers from outside and inside the school are graded and given comments on the training reports submitted by the students. After assessing the results, the instructor will provide students with training results to the hospital teaching steering committee, in the hospital for publicity, without objection, according to the results of student training achievements.

2.2.4. Training enterprise module

2.2.4.1. Information release module. The enterprise releases the training information, the enterprise culture, the teacher's introduction at any time, and has the direct correlation information with the training practice

2.2.4.2. Training resource module. According to the training schedule, upload training course resources at any time, so that students can use fragmentation time to carry out self-study.

2.2.4.3. Training process management module. Arrange practical training, carry out online communication, answer questions, publish daily attendance, training schedule, publicity and so on.

2.2.5. Student module

Students are the most important role in the school enterprise cooperation training management system. Students need to manage and maintain personal data, communicate with teachers, check scores and training opinions, and write personal experiences and so on. Therefore, student modules should include the following functional modules:

2.2.5.1. Login module. Since the number of students is relatively large, it is necessary for administrators to register each student's account number and distribute the registered account to every student participating in the training. The student list is imported by the administrator and no longer need to be registered.

2.2.5.2. Personal data modification module. Personal information modify module provides the personal information editing function for the user, the student user in the system not only contains the information related to school students, in addition, some information such as number, professional class, teacher information unified entry after no longer change, if there is an error, contact the teacher to revise the background business.

2.2.5.3. Student training module. Student training module is a platform for students to choose the direction of training, students through the module to choose the direction of professional practice, or the formation of innovative entrepreneurial team.

2.2.5.4. Problem communication module. Problem communication is a platform for students and teachers to communicate with each other. Students can express their experience and related business questions in the "my question" section.

2.2.5.5. View training evaluation and achievement module. Each student can log in to the system for a week after the end of the training session to review his evaluation, opinions and achievements during his training period, but he cannot modify the information. If there is any objection, it is necessary to make a review to the school guidance teacher and the enterprise instructor in the period of publicity.

2.2.5.6. Competition module. Students can according to published information on the contest, directly through the system to enroll, through the audit, namely learning materials and training notice through the platform to receive a college about the contest, and enjoy the competition related services.

2.2.5.7. Innovation and entrepreneurship module. Students can submit their own ideas, innovation and entrepreneurship projects through the platform, and give the project plan. After the audit, the company will provide financial, environmental and software and hardware support according to the specific circumstances of each project. At the same time, a team supported by the Institute will be required to submit project progress on time by platform.

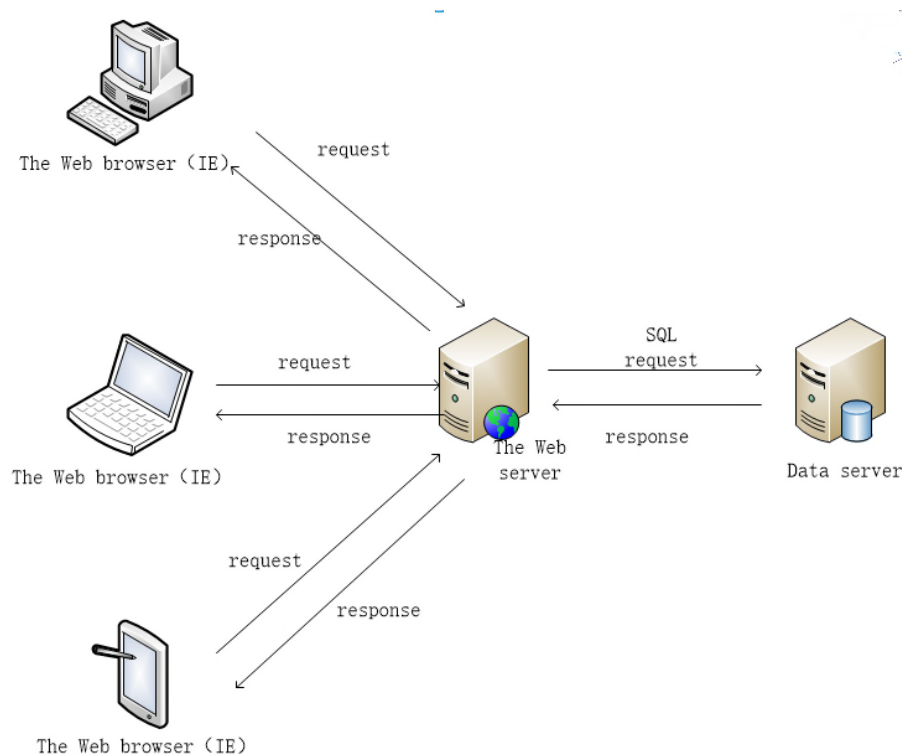


Figure 1. System architecture diagram.

3. System design

3.1 Overall architecture design

System software architecture shown in figure 1, each year's graduates are large, according to the voluntary choice of these students, more than half of the students through the school enterprise cooperation channels to participate in training. Because the user has the dispersion, the visit quantity to be big, moreover requests the system operation simple and so on the characteristic, we synthesize the above analysis, decided to adopt the B/S structure to carry on the design [6].

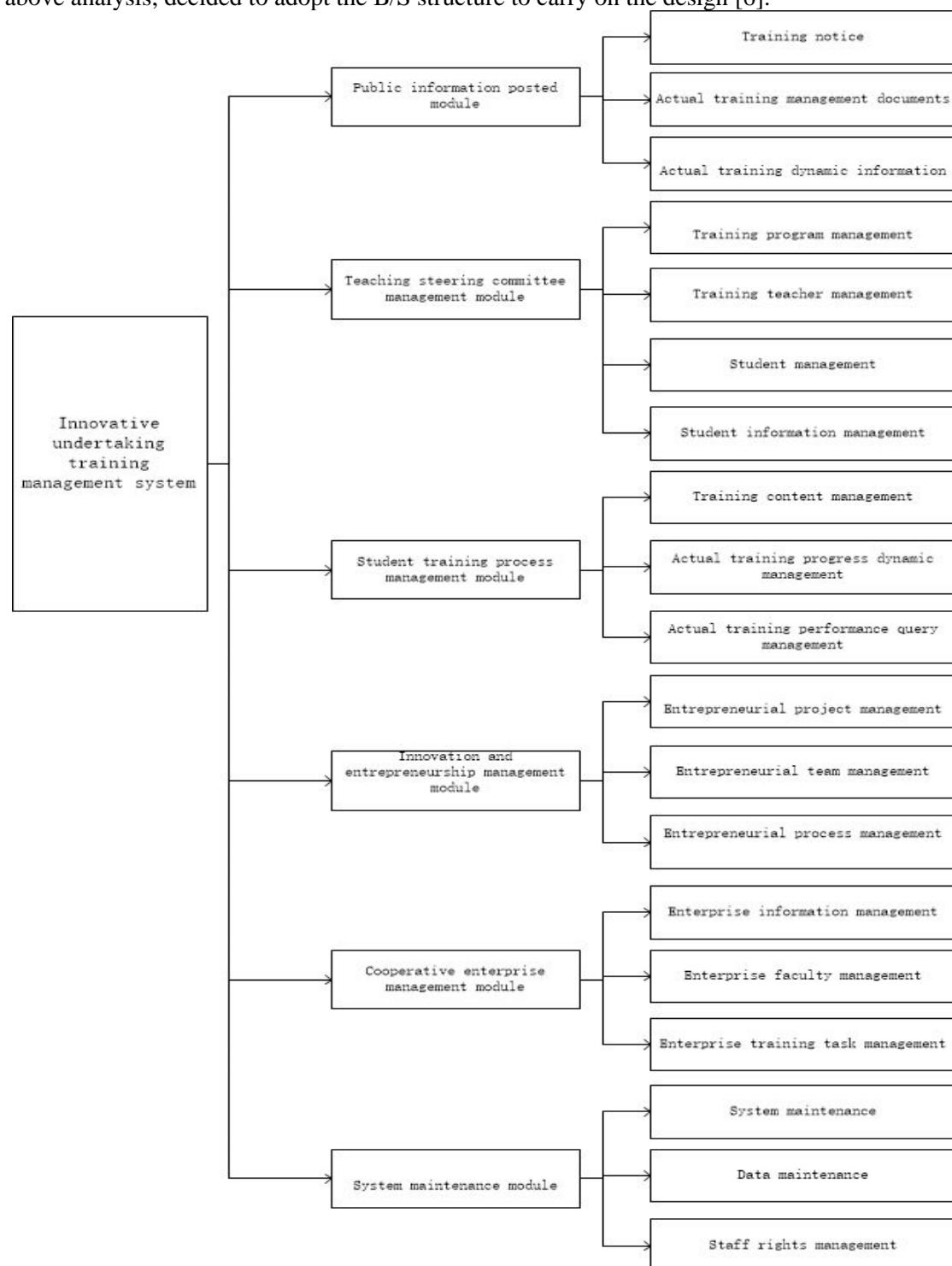


Figure 2. System function diagram.

3.2 Function module design

All of the above analysis, the main direction of this paper is to design the system of students enrolled in the training and Training Institute released direction information and both sides together on the training process of management, the school guidance teachers training evaluation and scoring, the tutor gives enterprise training evaluation and suggestions, training students' training results online inquiry and other business processes as the main line, and to the students, school teachers, school administrators and Teaching Guidance Committee for the four main users, they constitute the main users of the system type, we targeted for the following detailed design.

3.2.1. Instruction Committee

3.2.1.1. Management module design. Beijing University of Agriculture Institute of computer and information engineering student training arrangements is the Institute of Teaching Guidance Committee and the relevant person in charge of enterprises to fully communicate, and ultimately determine the content of training. School leadership and Teaching Guidance Committee in charge of the teaching needs to be combined with the actual situation, the enterprise can provide practical information for a reasonable analysis, but also a comprehensive training for students living conditions, work pressure, work environment and other factors into consideration, we can determine the specific programs and processes. All aspects of the program are completed, the two sides signed the relevant contract. Contract category is generally more, mainly including personal safety, accommodation and other living conditions, be sure to provide protection. Completed the work, to administrators and school guidance teacher appointment work, they are responsible for the information management system and training the students to guide the work of the Department, to complete the business enterprise leadership can guide teachers, school teachers query, query student information and training students training quality evaluation work from the system.

3.2.1.2. Function design of department management module. The training direction management needs the system information manager to create the corresponding module for the different team, then enters and manages the student's information. Department management, mainly administrators will be related to the college information input system, and classified management. In the management of teachers and students, the information administrator guides the teachers and their students into the information system and relates each other. All of these information management work is unified by the system information administrator. In the aspect of innovation and entrepreneurship management, the information administrator will publish and distribute the relevant resource information according to the requirements of the instruction committee.

3.2.2 Enterprise information management design

3.2.2.1. Workflow of information management system. Before the training begins, the enterprise will send decision information to the University, which is classified by the system administrator and stored in the system database.

3.2.2.2. Function design of enterprise information management module. Company introduction, the company introduced by system administrators, administrators will showcase the company's introduction and classification of information to students, can help students better understand the specific situation of the company, increase between enterprise and University students. The enterprise will pass the instructor's information to the administrator. The information administrator will be responsible for sorting the information and importing it into the system and it can also be modified.

3.2.2.3. Practical teaching management module. Training enterprises will be based on the progress of the course, appropriate upload corresponding sound, video learning materials, to facilitate students pre class preparation and review after class. At the same time, students will be able to control their learning progress through periodic publication, achievement and attendance.

3.2.3 Student training management module

3.2.3.1. Analysis of the main management during the training period. In the school enterprise cooperation relationship, students are the main role, in this system is no exception, they constitute the whole system is the most important core component, their demand is the core direction of the system

design direction. Therefore, students should be the first to design the system. This section mainly includes writing training reports, training online registration, inquiries, training results and basic information management operations.

3.2.3.2. Function design of student management module.

A student online registration

According to the training direction and the training enterprise, the student union will sign up on the system according to their own interests and professional skills.

B team formation and project reporting

Students can form various types of innovation and entrepreneurial teams through the platform, and declare the project in the form of a team, and apply for funds.

C training report management

Students need to log in their written reports so that they can see them. In addition, the teacher to students scoring and evaluation work is based on this internship report carried out.

D training quality evaluation

This part of the work is done by the teacher and is usually carried out after the student submits the report.

E problem communication

Mainly refers to students in the face of difficulties, in the system with the guidance of teachers to communicate and communicate.

3.2.4 Information announcement management module

This module is mainly made for students, and it is convenient for students to get the latest information about training, innovation and entrepreneurship at any time. There are many information bulletins, large and small, for both individuals and teachers.

3.2.4.1. Announcement management. In the announcement management, users can delete, query, edit and create the announcements

3.2.4.2. Issue a notice. If you want to publish the announcement, must be ahead of the announcement is created, but it does not mean that the announcement must be issued immediately in place, this time is flexible, the user can set the release date in the system, but also related to property announcement. The system releases bulletins for all users of the system, including enterprise personnel, university personnel, and training students.

Design of 3.2.5 system management module

System management work analysis: This includes the basic maintenance of system services, the distribution and management of different user rights, as well as the regular backup and maintenance of system data. These are specifically responsible for the system administrator.

A user rights management

More than one in the whole system in the role, according to the above analysis, the system contains four types of users, design according to different character set different permissions, so that different users can enjoy the convenience of information systems and related operations.

B data backup

Inevitably, there are inevitable emergencies, and data backup is an urgent measure to deal with these situations.

C system maintenance

The regulation of system performance is called system maintenance, and the performance of the server can be adjusted according to the running status of the system. In addition, you can always pay attention to the memory usage of the processor and the server, and do the corresponding operation.

3.3 Database design

3.3.1 Creates the base table

3.3.1.1. Admins table. As shown in table 1 for the main table administrator, administrator users to record relevant information, contains the following attributes: Office (type), name (name), ID (sex), gender, Department (dept-id), account number (account) and telephone (TEL) etc..

Table 1. Administrator table.

NO.	Field name	Field length	Data structure	Remarks	Primary
1	id		int		yes
2	name	30	nvarchar	name	
3	account	6	nvarchar	Account number	
4	tel	15	nvarchar	Telephone	
5	sex		bit	Gender	
6	tape	20	nvarchar	type	
7	Dept-id	5	nvarchar	Department id	

3.3.1.2. *Enterprise table.* As shown in table 2, the departmental information sheet records the relevant information of the enterprise department.

Table 2. Department table.

NO	Field name	Field length	Data structure	Remarks	Primary
1	id		int		yes
2	name	30	nvarchar	Department name	
3	num	5	nvarchar	Department number	
4	statum		bit	state	

3.3.1.3. *Student form.* As shown in table 3 for students to record student information table, mainly, the name (name), where the professional (college-id), gender (sex), QQ (QQ), telephone (TEL), mail (email), the class (class-id), where the school department (college-id), major-id (the professional), ID (account), account etc..

Table 3. Student table.

NO	Field name	Field length	Data structure	Remarks	Primary
1	id		int		yes
2	name	30	nvarchar	name	
3	account	10	nvarchar	Account number	
4	college-id	5	nvarchar	system -id	
5	sex		bit	Gender	
6	class-id	5	nvarchar	class-id	
7	qq	30	nvarchar	QQ	
8	major-id	5	nvarchar	major-id	
9	tel	15	nvarchar	Telephone	
10	Train-company-id	6	nvarchar	Train-company	
11	email	50	nvarchar	email	

3.3.1.4. *All school tables (colleges).* As shown in table 4 for all the school table, mainly used to record the relevant information of each department, a responsible person (leader), ID (depart-ID), office (office-phone), a (depart-mobil), ID, head of mobile phone (leader_mobi) etc..

Table 4. All school tables/

NO	Field name	Field length	Data structure	Remarks	Primary
1	id		int		yes
2	name	50	nvarchar	Professional name	
3	Dpart-id	5	nvarchar	Department of	

3.3.1.5. The school has a professional table (majors). As shown in table 5, the school table is used primarily to record school specific information.

Table 5. The school has a professional table.

NO	Field name	Field length	Data structure	Remarks	Primary
1	id		int		yes
2	Leader-mobi	20	nvarchar	Leader-mobi	
3	Dpart-id	5	nvarchar	Dpart	
4	leader	10	nvarchar	leader	
5	Dpart-name	50	nvarchar	Dpart-name	

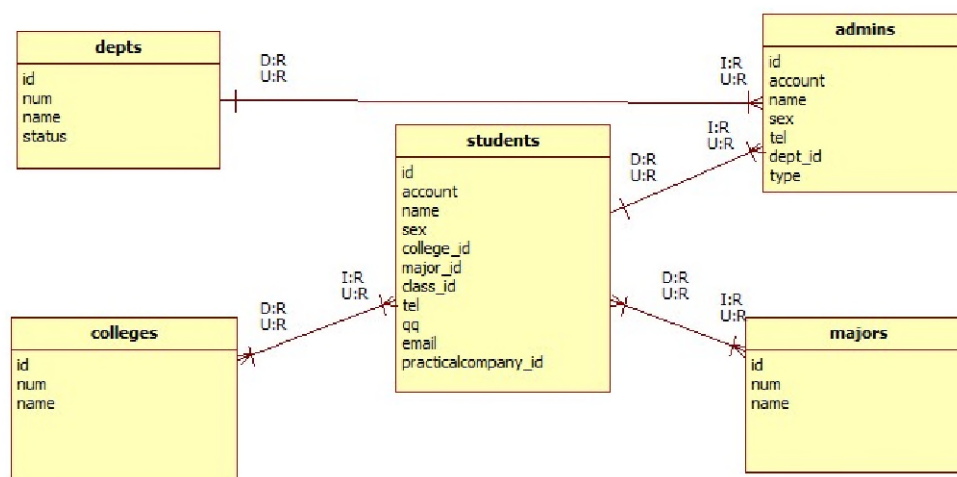
3.3.1.6. As shown in table5. Innovation and entrepreneurship team list;

Table 6. Innovation and entrepreneurship team.

NO	Field name	Field length	Data structure	Remarks	Primary
1	ID		int		yes
2	team_name	30	nvarchar	team_name	
3	team_lead	20	nvarchar	team_lead	
4	team_memb	20	nvarchar	team_memb	

3.3.2 Establish E-R diagram

In the E-R diagram, there are several relational graphs that appear frequently, namely, many to many (N:M), one to one (1:1) and one to many (1:N) three relations. Because of the limitations of space, we cannot show them here, so we will integrate the five tables mentioned above. As shown in figure 3.

**Figure 3.** E-R diagram.

4. Summary and Outlook

As an agricultural college in Beijing, Beijing University of Agriculture has attached great importance to the cultivation of students' practical ability. In order to expand teaching model, it actively promotes the school enterprise cooperation mode of running schools, through this way of cooperation to improve students' practical ability, but also to give students the opportunity to understand the society ahead of time. Students learn theoretical basic knowledge in school, and practical ability in practical training base [7]. Through this period of study and practice, students can feel the work method and work atmosphere before graduation, and it is a very beneficial experience for college students.

The main purpose of this study is to provide a very effective communication platform for enterprises and schools. With the Ruby development language and RubyMine development tool, the basic information of school teachers, teaching guidance committee function module, enterprise settings, user login and students to participate in the training module (including internship report, fill in registration etc.) can be put into practice. The innovation and entrepreneurship training management system based on school enterprise cooperation has a very practical and high scalability characteristic, such characteristics make it more close to the real teaching management work.

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