**Development Project:**

**Student Assisted E-learning System**

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**图形用户界面

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# Abstract

This report covers a prototyped Student Assisted E-learning System, which is develop based on the GitHub project of <https://github.com/caozongpeng/SpringBootBlog>.

The back end of the system includes springboot, mybatis, thymeleaf and laiyu etc., while the front-end uses jQuery, bootstrap and Vue etc.

Compared with the traditional teacher-centric learning mode adopted by blackboard and Moodle, the system will adopt a dynamic education model, which is student-centered learning mode, this system will create an environment to provide guidance and suggestions for students according to their needs, stimulating their motivation and ability of autonomous learning, thus realizing campus democratization and equal opportunities.

# Background research

Nowadays, with the rapid development of the labor force and education structure paradigm, technology growth must maintain the same speed, which leads to knowledge becoming the basis of social development, Therefore, education has become a very important link in the social cycle（Gowda, R.S. & Suma, V. 2017）. According to the survey, the proportion of young people receiving university education increased by 20 percentage from 1995 to 2006, （Manzo, K.K. 2008）. this figure grows even faster in developing countries ，77% in 8 years(Sawiński, Z. 2013）.

## Current situation of e-learning system

Since the emergence of the E-learning system in 1945, its development has been a concern by all countries. however，for years, E-learning has always been regarded as a substitute for offline education(Al-Qahtani, A.A.Y. & Higgins, S.E. 2013). In recent years, with the development of IT and Internet technology, people seem to find a new possibility of E-education , which allows developing the E-platform providing distance learning activities into a more advanced E-learning environment（Raspopovic, M., Cvetanovic, S. & Jankulovic, A. 2016）.

In order to better understand this new advanced E-learning environment, it is essential to understand the definition of ‘Learning'

## Definition of Learning

Learning is the act of acquiring knowledge or skills through studying, experiencing, or being taught（Gowda, R.S. & Suma, V. 2017）. It can be said that learning is a way to renew and broaden self-cognitive space. Therefore, learning is regarded as a basic principle. According to the research of Berkeley University, learning is an active process, which is based on prior knowledge and takes place in a complex social environment. this action requires learners' motivation and cognitive participation (Berkley Center of Teaching and Learning, 01 2017). Learning can be divided into two categories, the first is teacher-centered learning, and the second is student-centered learning. (see figure 1)

# Learning

# Student-centered learning

# Teacher-centered Learning

# Figure 1 category of learning

## Teacher centered learning

In the teacher-centered learning mode, the teacher is responsible for guiding the students to learn, they usually design the syllabus in a structured and stable way and carry the teaching in the class following the predetermined syllabus, so that the students in the class will not deviate from the actual motivation of learning. The teacher helps the students by explaining concepts, showing examples, and eliminating doubts in the class. In this mode, the students follow and trying to learn every content taught in the classroom, thus this way is also considered to be a kind of guiding learning, which means there is no room for cooperation. meanwhile, talking or consulting in the class will be considered as undisciplined.

The advantage of this mode is that it can make the classroom run orderly. Students do not make a sound, and all the activities in the class are under the control of the teacher. The teacher is responsible for guiding every activity in class and ensuring that students don't miss any important knowledge points.

However, this kind of education also has some disadvantages. For example, students can't choose their own teachers, also, the predetermined syllabus limits the scope of learning, As a result, students are unable to learn the knowledge facing enterprises as these knowledges beyond the scope of the syllabus(Rui,M. 2012)

## student-centered learning

Compared with teacher-centered learning, this mode of learning is carried out by students in their own way. They can choose the teachers they want to study with, ask questions to the people they want and complete the task independently through self-learning. In this mode, teachers are more like promoters and helpers. teachers will provide all the necessary resources for students to ensure that their experience of learning can be undisturbed. in this mode, the focus point is the students' interest, learning style, and understanding ability (Ibrahim Albidewi and 2Radi Tulb, 2014).

# The Problems and objectives

As the traditional teacher-centered education method exposed more and more defects, Much shreds of evidence point out that the future development trend of education tends to be student-centered（Gowda, R.S. & Suma, V. 2017）. in this project, the author will design a prototype of an E-learning system that adopting this new educational method, by doing this， will not only change the current situation that most e-learning platforms only adopt teacher-centered teaching methods, but also promote the development of new educational mode, through developing this project, the author also hopes to solve the following problems in the traditional education model：

1： Student must learn the arranged courses, they have no right to choose, leading to students lose interest in learning.

2： different students have different learning preferences. Some people may understand quickly through the help of images, while others may prefer words and reading. Some people may deal with theory well, others may learn by experiment and example. Different learning styles are not suitable to adopt just one teaching syllabus.

3： In today's society, some courses that are unnecessary for helping students to find a job will also be included in the high cost of university education, which makes most young people who are eager for employment but come from poverty are fear and stop accepting higher education because of the high debt cost, thus they falling into a strange circle, that is, because they don't have enough money to go to university, so there is no way to learn the skills required for work, as they cannot use good skill to find a good job, so they unable to get out of poverty

4: The pre-defined syllabus limits the scope of students' learning; students are unable to learn knowledge face to the requirement of enterprises

5: According to the time specified in the scheduled syllabus, students must sit in the classroom to study, even if they understand the knowledge in advance, they cannot leave, which wastes a lot of time

# Design of the system

## Development Lifecycle:

In the development life cycle of the e-learning system project, the waterfall development method was adopted. In the beginning, I was perplexed about whether to choose agile or waterfall. However, because I started to prepare for software development in January, at that time, I already had a general direction. In addition, the unstable interaction with the tutor made my feedback very limited, this means that the agile method that often needs to interact with customers may not be suitable for this activity, and the deadline of the project has been set at the beginning, which means that the delivery cannot be advanced, so I finally chose the waterfall development method.

As a waterfall development method, its development process follows a specific linear sequence from beginning to end, which means that the process will be roughly divided into the following steps: requirement analysis, element definition, basic design, detailed design, coding, testing, requirement change, regression testing, delivery.

The specific arrangements are as follows:

图表, 日程表

中度可信度描述已自动生成

Figure 2

## System test

At the end of waterfall development, the system will be tested, which is divided into black box test and white box test. The specific test method has been clarified in the previous essay, this time will publish directly; s

|  |  |  |  |
| --- | --- | --- | --- |
| **Test name** | **Is there a bug** | **test result** | **Test instructions** |
| **Website interface** | **None** | **Pass** | **Skip test** |
| **None** | **Pass** | **Display test** |
| **Function button test** | **None** | **Pass** | **Button function test** |
| **Form test** | **None** | **Pass** | **illegal input filter function** |
| **Database storage test** | **None** | **Pass** | **Whether data can be stored in time** |
| **Database query test** | **None** | **Pass** | **Can fast query be realized** |
| **Database concurrency test** | **None** | **Pass** | **Can multiple users access simultaneously and simultaneously** |

It is worth noting that although the waterfall method requires strictly following each step, the author and his supervisor decided to add several functions after later discussion, which resulting the system design become slightly different from the original design, here is the system design diagram which is different from the original：

## Functional requirement:

Administrator side added team management function.

Teachers side add knowledge point management function and paper assignment management function.

student side adding select group functions are and joining forum function.

s

E-learning assistant system

**Administrator module**

**Student module**

**Teacher module**

**Completing test and assignment**

**User management**

**Knowledge Points studying**

**Group related query**

**To do list**

**learning point management**

**Group management**

**Paper Assignment &test management**

**group management**

**password modification**

**John forum**

**paper Assignments uploading**

**Phase test& mock test publish**

**select group**

**Result calculation viewing**

**Result correction and checking**

Figure 3

## E-R diagram design

Adding class id in each side in order to realize the concept of group restriction

图示

描述已自动生成

Figure 4

# Develop of the system

## System backend function realization

As the source and storage warehouse of the whole website data, the database realizes orderly storage according to the relevant association rules and realizes fast query, storage, deletion, and other operations according to the internal index, which is the core of the whole website design.

The database provides a data-sharing service for the whole website, and its powerful concurrent processing capability makes it possible for each user to access the same data at the same time. To reduce data redundancy and improve the speed of data query, the database provides users with a unified data management function. At the same time, to improve the security of data storage, the internal database realizes the independent storage of each data.

This system uses the MySQL database to realize the unified management of learning materials and user information. Its lightweight, centralized data control and fault recovery are the main principles of the design of this project. In order to ensure the independent login of the three types of users, the attributes of the user information table (test\_user) are set as the following 11 fields: userid, username, userpwd, userType, userstate, realName, email, telephone, address, remark, and CLassID, In the whole process, users are distinguished mainly through UserType filed. In the user login process, the information transmitted by the form will match the user table in the database to complete the user's website login. The figure below shows all the objects in the database.

图示

描述已自动生成

Figure 5

# System frontend function realization

## Login interface

This e-learning platform uses HTML language with CSS style design to complete the design and layout of the whole system interface (Songling, X, 2019). The following is the interface display of each function of the website.

According to the report, a well-designed login interface can attract more users (Raspopovic, M., Cvetanovic, S. & Jankulovic, A. 2016). meanwhile, a user-friendly interface with a good design style largely determines the use frequency of the system (Zaharias, 2005), so the author decides to use a simple and generous design style for layout, to provide users with a good interactive environment, as shown in Figure below.

**图形用户界面

描述已自动生成**

Figure 6

图形用户界面, 文本, 应用程序

描述已自动生成

Figure 7

The login interface is the entrance of the website. To realize the intuitive user differentiation, the user can use the drop-down menu to select the account type when designing the website login interface. The user can log in to the website according to his own role and the assigned account type. In the process of user login, the form will send the user type, account number, and password selected from the drop-down menu to the server through post request, and then the server will complete the login process by querying and matching these three fields in the database.

## Administrator page

As the highest authority holder of the website, the manager plays an important role in the daily maintenance, security supervision, and user management of the website. In order to prevent the loss and theft of the administrator's account and threatening the security of website data, the administrator's authority does not support batch data modification and deletion and log in from the teacher and student ports. In the process of website design, the permission value of the administrator user is assigned to 2, as shown in the Figure below.

****

Figure 8

The administrator user interface is mainly designed according to the functions diagram designed in first essay, each function module corresponds to an independent interface, as shown below：

Figure 9 is the administrator home interface.

Figure 10 is the teacher management interface.

Figure 11 is the add / edit teacher interface.

Figure 12 is the student management interface,

Figure 13 is the add/ edit student interface,

Figure 14 is the administrator account modification interface.

Figure 15 is the group management interface,

Figure 16 is the group edit interface.

It is worth to note that it is no need to go to a new interface to create a new group

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 9

图形用户界面, 应用程序

描述已自动生成

Figure 10

图形用户界面, 应用程序, 电子邮件

描述已自动生成

Figure 11

表格

描述已自动生成

Figure 12

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 13

图形用户界面, 应用程序

描述已自动生成

Figure 14

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 15

图形用户界面, 应用程序, Teams

描述已自动生成

Figure 16

## teacher interface

Since the main objective of an e-learning system is teaching and learning, the most important task of it is to find out whether students can learn effectively by using this system (Mark &amp; Greer, 1993). Therefore, in the teaching process, the evaluation function has become a very necessary function as it provides decision-making information about whether to use the product and evidence of whether students learn effectively from the system. As a result, the teacher's interface will be closely related to a variety of assessments. teachers can freely arrange phase test, mock test, and paper assignment to a different group, through a variety of assessment, teachers can get effective academic evidence, to prove the potential value and success of their specific teaching syllabus (Grubišić, A., Stankov, S., Rosić, M. & Žitko, B. 2009)

Teachers mainly complete functions of knowledge point management, group management, paper assignment, tests release, and modification, which make teacher play one of the core roles of the whole system. the file upload and download operation in the module mainly obtains the input stream of the uploaded content through service, then analyzes it internally, finally realizes the file content mounting, and stores it as a byte array. This design mainly relies on the common-fileUpload component of the Apache open-source tool to complete the function. During the implementation of this system, teachers have the authority to publish and manage assignments, tests, and knowledge points. The authority assigned value is 1, as shown below.



Figure 17

It is worth noting that the class ID of the teacher who creates the assignment/test/knowledge point will be saved when the test, assignment, and knowledge point are created. When students try to look up these contents, a query will be executed，which will query the data of the corresponding table according to the student's ID, if the classID of the related table is consistent with the class ID of the current student, and satisfies some other additional states (for example, the status of the knowledge point needs to be 'publish', then the data will be displayed.

In order to simplify the function and improve the stability of the system, each function module is corresponding to a single interface, and each function interface is as follows:

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 18

As can be seen from Figure 22, the whole teacher module is divided into eight functions. The first one is the to-do list. The main function of this function is to remind teachers of the number of uncorrected assignments and test papers, as well as the number of assignments and test papers issued. At the same time, the login log of the system is attached in the lower right corner of the interface, which can timely detect illegal login users and improve the security of the system

图形用户界面, 应用程序

描述已自动生成

Figure 19

The function of phase test management mainly includes the publishing of examination content (adding test papers) and the operation of test papers (topic management, preview of test papers, view of test records), etc.

Figure 20 showing that the teacher can view the historical test paper information of the published examination in this interface and Figure 21 showing that a new test paper has been added.

图形用户界面, 应用程序

描述已自动生成

Figure 20

图形用户界面, 应用程序

描述已自动生成

Figure 21

In order to improve the efficiency of marking papers and reduce the workload of teachers, the author realizes the function of automatic score statistics for the papers submitted by students. In this interface, teachers can easily count the scores of students, and design corresponding score statistics modules according to the needs. The interface is shown in Figure 22. At the same time, the examination is divided into multiple-choice questions and short answer questions/essay questions, the teacher can choose the correct answer in advance, so that when scoring, the system can automatically complete the answer matching, reducing the pressure of the teacher's answer. The interface of these two type of question shown in the figure 23 and 24.

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 22

图形用户界面, 应用程序, 电子邮件

描述已自动生成

Figure 23

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 24

In order to review the content that students have learned in order to face the formal phase test better, teachers can also release mock tests to help students better prepare for the real exam, The function interface design of the mock test continues to use the design of phase test interface. Shown as below:

图形用户界面, 应用程序

描述已自动生成

Figure 25

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 26

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 27

At the same time, in addition to publishing the corresponding tests, teachers can also help students to learn better by publishing paper assignment,

Figure 28 is the management page of the assignment,

Figure 29 is the adding page of the assignment.

Figure 30 is thepreview page of the assignment.

Figure 31 is the scoring page of the assignment.

图形用户界面, 表格

描述已自动生成

Figure 28

图形用户界面, 应用程序, Teams

描述已自动生成

Figure 29

图形用户界面, 应用程序

中度可信度描述已自动生成

Figure 30

图形用户界面

中度可信度描述已自动生成

Figure 31

Knowledge point management has a page similar to assignment.

Figure 32 is the management page of the Knowledge point

Figure 33 is the adding page of the Knowledge point

Figure 34 is the preview page of the Knowledge point

Figure 35 is the delete operation page of the Knowledge point.

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 32

图形用户界面, 应用程序

描述已自动生成

Figure 33

图形用户界面, 表格

描述已自动生成

Figure 34

图形用户界面, 应用程序, Teams

描述已自动生成

Figure 35

At the same time, teachers can see all group, as well as all students with their detail in the group, in case there are too many students in the same group, leading to forgetting which group has which student.

Figure 36 showing all the group in group managing page

Figure 37 showing the number of students in one group and the detail of these students.

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 36

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 37

## 

## Student interface

According to reports, in the student-centered learning environment, students' sense of self-efficacy can be comprehensively improved, self-efficacy is related to the individual's belief in their own executive ability (Bandura, 1997). It does not represent actual abilities and skills but as a form of self-evaluation of individual abilities. Self-efficacy influences the decision of which behavior to take, and the consequent effort and persistence (Bandura, 1997). It can play the role of self-motivation (Kankanhalli et al., 2005). Therefore, when students have great initiative, their sense of security and self-efficacy will be greatly increased. When individuals have a higher level of self-efficacy, they are more inclined to express their own behavior, so as to be responsible for their own behavior and achieve better results（Zhang, Y., Fang, Y., Wei, K. & Wang, Z. 2012）.

Therefore, in the design of the student page, the author allows students to take the initiative to choose the group they need or like to join (see Figure 39), and after joining the group, they can view the examinations, assignments, and knowledge points issued related to the group. However, although students have strong initiative, they have the lowest authority compared with teachers and administrators, although students upload the assignment they completed ，they cannot create test paper and knowledge points, so in the implementation process, the permission of student users is 0



Figure 38

图形用户界面, 应用程序

描述已自动生成

Figure 39

The phase test function mainly imitates the interface style used in daily phase tests, including the countdown of answer time, the prompt of answer card, and the prompt of paper submission. As shown in Figure 40 is the test answer interface, figure 41 is the answer card prompt, and figure 42 is the submission prompt.

电脑网站的截图

描述已自动生成

Figure 40

图形用户界面, 文本, 应用程序

描述已自动生成

Figure 41

图形用户界面, 文本, 应用程序

描述已自动生成

Figure 42

The Mock test function mainly adds the function of saving based on the phase test interface. The rest function all follows the design of the phase test interface， Figure 43 showing the interface of answering the question in the mock test page

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Figure 43

At the same time, as shown in Figure 44, students can use the assignment function to download the assignments handbook or requirement provided by the teacher. After completing the coursework, they can also use the assignment function to upload and hand in their finished coursework.

图形用户界面

低可信度描述已自动生成

Figure 44

In addition, it is worth noting that when students join a group, they can also join the forums in each group to communicate with different students. The reason for setting this function is that students can ask questions through this function and discuss with other students how to solve problems. This kind of feedback response-ability is an important feature of the social environment. According to the theory of social cognition, this kind of social environmental factor will affect self-efficacy and personal behavior (Zhang, Y., Fang, Y., Wei, K. & Wang, Z. 2012). By obtaining timely and appropriate answers (e.g., answers to their questions), participatory behavior will be strengthened, and students will be willing to continue to participate when they realize its effectiveness (EL-Deghaidy, H. & Nouby, A. 2008), which means that this kind of cooperative learning will maximize the development of their own and each other's learning ability.

Figure 45 shows the forum/message board page

图形用户界面, 文本, 应用程序

描述已自动生成

Figure 45

In addition, in the design concept of the whole project, the duration of each group is only 3-4 months. This is due to the long schooling and expensive tuition in the past, resulting in most British students need loans to complete their university studies. A report points out that in 2002 / 2003, the proportion of student loans in the outstanding debts of students increased from 74% in 1998 / 99 to 85%（Davies, E. and Lea, S. 1995）. meanwhile, As more and more students apply for loans, the amount of loans is getting larger and larger, and the student debt also increases. From 1999 to 1996, about 75% of the students were in debt when they graduated, but this figure increased to 92% in 2003. according to the report, In 2003, the average debt of each graduate was 8666. （Callender, C. and Wilkinson, D. 2003）

However, because the distribution of debt is unequal, poor students are more likely to be in debt when they graduated from university, while rich students are less likely to be in debt. According to the survey, in 2003, （Callender, C. and Wilkinson, D. 2003） students whose parent's annual income is less than 20480 owe an average of 9780, half of them owe more than 10392, while students whose parent's income is more than 30502 owe an average of only 6806, which means that the debt of the poorest students is 43% higher than that of the wealthiest students. The high debt makes many poor students shy away from entering university, which makes them unable to learn enough skills to enter companies. which will further aggravate their poverty, thus leading to the growing class gap in society.

However, through group short-term learning, it is possible to shorten the tuition as much as possible. At the same time, students can pay only a little tuition fee in return for enough skills and knowledge to support them to go to work or enter the company directly.

Most importantly, the report points out that the current content taught by the most university cannot catch up with the speed of technological innovation of the times, such as software engineering, computer science, and other majors. （Rui,M. 2012） Through small group design and a fast iterative teaching cycle, the teaching content can be more market-oriented and practical, and students can obtain the latest knowledge.

应用程序

低可信度描述已自动生成

Figure 46

Figure 46 shows the last and most important function on the student page, that is, the knowledge point function, because, in the student-centered education model, self-study is a very important way to improve themselves. The knowledge point function enables students to carry out targeted reinforcement learning according to the knowledge released by teachers.

It is reported that a lot of student's time is wasted using the teacher-centered learning method as most of the students' valuable time is wasted in class（Gowda, R.S. & Suma, V. 2017）, for example, even if the student understands or find out the answer to the problem ahead of time, He cannot leave the classroom, which wastes a lot of time. The same report points out that, compared with the traditional teacher-centered learning method, through self-learning, can save 96 hours within four months（Gowda, R.S. & Suma, V. 2017）. This proves the importance of knowledge point function, as this function can make students get rid of the fixed classroom, maximize their ability, and save their precious time.

# Critical analysis

## Tool used

## Spring boot

Spring boot framework is the upgrade of spring framework, and its open source is highly sought after by users. It is one of the mature microframeworks in the web framework. Compared with the traditional web framework, the Tomcat server is embedded in it, which greatly reduces the project configuration dependence and simplifies the configuration process. The integrated Maven project management tool improves the probability of successful project construction to a certain extent and provides a friendly experience for beginners. At the beginning of the framework design, considering that the module stacking increases the overall coupling degree, the different modules in the project are transformed into small services, and each small service communicates through hypertext transfer protocol, so as to reduce the coupling degree of the project and improve the robustness of the whole.

Experience to use this tool:

① The framework can be loaded automatically without the need to configure tedious dependency files

② The project file can run independently without interference from dependent files

③ Embedded container accelerates project running

④ Hierarchical structure and clear business logic

⑤ Simplify the deployment test steps of the project and improve the output efficiency of the project

Although spring boot is very popular in enterprises, I did not have the opportunity to contact the framework during my college years, which led me to spend a lot of time on learning. It also proved that the traditional education based on teachers cannot keep up with the times and the development of science and technology.

## mybatis

Mybatis is a persistence layer framework that supports common SQL queries, stored procedures, and advanced mapping. It eliminates almost all effort for manually setting of JDBC code and parameters as well as the retrieval of the result set and uses simple XML or annotation for configuration and original mapping to map interface and Java POJO (Plain Old Java Object) to records in the database, At the same time, mybatis is very flexible, and will not impose any impact on the existing design of the application or database. This allows me to write SQL in XML so that it can be completely separated from the program code, while reducing the coupling degree so that SQL can be easily unified management and optimization, reusable.

However, when using mybatis, the workload of writing SQL statements is large, especially when there are many fields and many associated tables. Because my SQL statement writing foundation is not very strong, I often need to go to the Internet to search how to write SQL statements, meanwhile, the SQL statement relies on the database, which leads to poor portability of the database and cannot replace the database at will.

## Thymeleaf

Thymeleaf is a modern server-side Java template engine for web and unique environments. It can handle HTML, XML, JavaScript, CSS. using Thymeleaf is very convenience， I just need to add tag attributes to the template. and then these tag attributes will perform pre-determined logic on DOM (document object model). meanwhile, Thymeleaf is also very scalable. I can use it to define my own set of template properties so that I can compute custom expressions and use custom logic. This means that thymeleaf can also be used as a template engine framework.

## PageHelper

PageHelper is an excellent open-source mybatis paging plug-in in China. Its implementation principle is to set paging parameters in ThreadLocal, and then obtain paging parameters in the thread when the query is executed. When the query is executed, add paging parameters in the SQL statement through the interceptor, and then realize the paging query, After the end of the query, clear the query parameters in ThreadLocal in the finally statement. PageHelper is very simple to use, and it is also non-intrusive to SQL, but it is not very safe, because PageHelper guarantees that when the code is executed to the executor method, it will clean up the paging identifier in ThreadLocal in the finally fast. If the code is not executed to the executor method, it will be abnormal, Which would cause ThreadLocal pollution.

## Vue

Vue is a progressive framework for building user interfaces. Unlike other large frameworks, Vue is designed to be applied layer by layer from the bottom up. Vue's core library only focuses on the view layer, which means that it is not only easy to start and master, but also easy to aggregate with third-party libraries or existing projects. However, Vue also has some disadvantages. The first disadvantage is that it is not conducive to SEO optimization. The second disadvantage is that the speed of above the fold is very slow. Because when loading, it needs to load all the CSS and JS files.

## Layui

Layui is a front-end UI framework written with its own module specification. It follows the writing and organization form of native HTML / CSS / JS. The threshold is very low, and it can be used directly. This means that I don't need to get involved in various complex configurations. I just need to face and develop the browser itself, which makes the development process become very convenient and easy. however, At present, this framework is not very mature, and it is troublesome to realize the front-end interaction because the DOM elements need to be queried when adding, deleting, changing, and querying pages

## Mysql

The Mysql database is the best choice to match the framework. As the earliest open-source relational database, its lightweight and easy-to-operate characteristics have always been the best choice for small and medium-sized enterprises and learning to use. Because the design is oriented to the campus, the concurrency of data is a big performance of the ability of the database to manage data. As the storage engine of the database, InnoDB's data structure has been effectively optimized, which can achieve fast index and access, reduce the I / O overhead to a certain extent, improve the data throughput and concurrency characteristics, and fully meet the demand of the number of campus users.

## IntelliJ IDEA

This design uses IDEA integrated development environment in the development process, and its powerful intelligent code prompt, error correction tool, and stable compilation environment are very useful during the whole process. In the construction of the code method, IDEA can quickly reconstruct the selection range, which greatly facilitates the writing of code and the adjustment of format. In addition, for the fixed-format method, IDEA can realize intelligent automatic generation, which greatly improves the speed and efficiency of code writing.

In addition, IDEA can provide friendly support for all kinds of popular XML files, highlight redundant code, simplify code structure and improve code readability. Support for Javadoc preview can help me improve the quality of code to a certain extent. It can also complete the debugging of JS, jQuery, Ajax, and other related technologies, which greatly facilitates the whole programming process.

# Problems encountered in development

The biggest problem of the whole project is the conception and structure of the website because this project is developed based on the blog system. How to integrate the two seemingly unrelated parts of the blog system and teaching system is the key to the success of the website design.

In the design process, this system fully absorbs the design scheme of the traditional blog system and the examination system and realizes the ingenious combination of the two parts by using the jump of the web page and the matching of keywords.

In addition, about the file upload storage problem. In order to simplify the system, I gave up the idea of using the file server to store files, instead, I stored the files directly in the database, but this caused the problem of poor upload effect of large files. Considering that the size of the class assignment file will not be very large, it is expected that the impact will be small, so the way of directly storing the database is adopted.

Finally, the front-end framework selection of this project is chaotic, I should use Vue at the beginning to really conform to the idea of MVM

Product evaluation

through the development of the product, we can better develop the student-centered education mode, and learn according to the students' own needs; The e-learning platform not only provides a variety of rich learning resources, but also gives learners the right to choose their own learning methods. This enables learners to set their own goals, conduct self-assessment at each stage, and learn at each stage until they evaluate their progress., At the same time, the short-term schooling and relatively low tuition can help poor students quickly master skills, thus successfully obtain employment and get out of the vicious circle of poverty.

# conclusion

This paper provides a prototype of the teaching method in the new era, which can solve the problem of students' interest in learning and loan problem, and at the same time better input talents to the society. On the other hand, this mode can save students enough time, to achieve the effect of lean learning. In the future iteration, the system should focus more on the development and implementation of more appropriate self-assessment activities, because students think these activities are very important, these activities are directly related to students' understanding of the importance of network learning systems in learning. In addition, the future work should add the overall statistics and drawing function of students' achievements from the perspective of teachers and institutional management, so as to make students more clearly understand their learning achievements in a period of time through visualization.

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# Appendix

Code for the system

Login part:

文本

低可信度描述已自动生成

图形用户界面, 文本, 应用程序

描述已自动生成

The page login parameters are sent to the login interface. In the method, the parameters are put into the request body and returned to the front-end method for login.

Query:

文本

描述已自动生成

Call the getuserbypage method with the parameter as the condition to return the paging data.



图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Save and update:

文本

描述已自动生成 By querying all the data, and then judging the echo according to the user and type, the parameters are put into the request body to return to the front end, and the front end displays the saved data back to the page.

Delete:

文本

低可信度描述已自动生成

The page passes the parameter ID, and the back end queries according to the ID

图形用户界面

中度可信度描述已自动生成

图形用户界面, 文本, 应用程序

描述已自动生成

After successful deletion, return to the front end for deletion information.

Query all users by ID

图形用户界面, 文本

描述已自动生成

According to the group ID, the role type queries the teacher and returns

图形用户界面, 文本, 应用程序

描述已自动生成

New group

图形用户界面, 文本, 应用程序

中度可信度描述已自动生成

Submit phase test answers

图形用户界面, 文本, 应用程序

描述已自动生成

Submit mock test

文本

中度可信度描述已自动生成

Save mock test

Query job details according to ID

图形用户界面, 文本, 应用程序

描述已自动生成

图片包含 图示

描述已自动生成

Login

文本

描述已自动生成

图形用户界面, 文本

描述已自动生成

Exit

文本

描述已自动生成

Types of preservation

图形用户界面, 文本, 应用程序

描述已自动生成

Delete category

图形用户界面, 文本, 应用程序

描述已自动生成

Upload attachment

文本

描述已自动生成

New homework

图形用户界面, 文本

描述已自动生成

Update homework

图形用户界面, 文本, 应用程序

描述已自动生成

文本

描述已自动生成

Delete homework

文本

描述已自动生成

view message

图片包含 文本

描述已自动生成

New message

图形用户界面, 文本, 应用程序

描述已自动生成

View messages and replies by ID

图形用户界面, 文本, 应用程序, 电子邮件

描述已自动生成

Homework modification record

文本, 应用程序

描述已自动生成

Query grouping

图形用户界面, 文本, 应用程序

描述已自动生成

Add group

图片包含 图形用户界面

描述已自动生成

Delete group

图片包含 网站

描述已自动生成

Edit group

图形用户界面, 文本, 应用程序

描述已自动生成

Show students

图形用户界面, 文本, 应用程序

描述已自动生成