Innovative Practice of College English Network Teaching Path Under Flask Framework

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Abstract. With the rapid development of "Internet + Education", the advantages of online teaching are highlighted, which promotes the continuous transformation of college English teaching mode to modernization and intelligence. In this regard, this paper will build a Web-based online teaching system for college English majors based on the characteristics of college English courses and the practical characteristics of network information technology, database management technology and computer application technology. The whole system is B/S architecture, the front-end interactive interface is designed and developed with Bootstrap framework as the core, and the back-end Web Server is built with Flask framework, and Mysql database is used as the system support. The function of the system will fully cover the needs of college English teaching, and the network and digital transformation of teaching activities will be completed by multi-dimensional display method. Especially in the aspect of learning achievement evaluation, the system will establish its scientific and effective evaluation standard with the help of fuzzy AHP algorithm, which will solve the pain point of online teaching and realize the innovative practice of online teaching path of college English.

Keywords: Internet plus · College English · Network teaching · Python · Computer application

1   Introduction

At present, the iteration of science and technology and economy is accelerating in the era of globalization, and the multi-dimensional exchanges and cooperation between countries are also deepening. Accordingly, as a universal information carrier, English plays an important role in international communication. With the promotion of opening to the outside world and the national strategy of "the belt and road initiative", it is an urgent problem for colleges and universities to strengthen the cultivation of compound English professionals and promote the reform of English teaching mode in colleges and universities. [1] On the other hand, there are some problems in the current college English teaching process, such as low interest in learning, weak application ability and poor teaching effect. At its root, the traditional teaching mode of college English has been unable to meet the demand of compound talents in the new era, and the problems such as single teaching content, inherent teaching form and lack of practice have seriously

affected students' learning ability and application level. [2] In view of this, this paper holds that colleges and universities should actively grasp the concept of cultivating English talents at this stage, adhere to the drive of innovation, and build an online teaching system for college English majors based on Web with the help of the practical characteristics of network information technology, database management technology and computer application technology, so as to lay a solid foundation for the smooth implementation of college English online teaching mode. [3].

2 Development Process

First of all, the conventional "LAMP" development mode, namely, Linux + Apache + MySQL + Python mode, will be selected for the construction of the back-end Web Server of the online teaching system for college English majors. [4] Among them, Linux CentOS 7.3.1611(64bit) is selected as the bottom operating system, Python is selected as the basic development language environment, version 3.10.2, and Pycharm 2019 is selected as the integrated development tool. The Web server is Apache 2.4.16, and the database server is Mysql 5.7.31. After the software installation is completed, directly select Flask when creating new items in Pycharm and create an independent virtual environment. At the same time, the basic directory of the project will be set up, mainly including Manage.py, Urls.py, wsgi.py and Settings.py [5].

Secondly, the design and development of the front-end interactive interface of online teaching system for college English majors need the help of Bootstrap framework. In the actual development process, Bootstrap framework uses Layoutit tools to complete the layout and design of web pages in a convenient and drag-and-drop way, which greatly reduces the editing time of the original script code. At the same time, Layoutit tool also supports saving all codes and files. [6].

Finally, copy and import the code and file of the front-end page into the file directory in Flask application. Other functions in the system can be developed according to the requirements. For example, in the statistical analysis of students' learning data, we need to use Python's own Numpy, matplotlib and other class libraries to complete the construction of AHP analytic hierarchy process model algorithm. The key codes are as follows. [7] After the functional modules are designed, all the files are packaged and published on the server, which is convenient for users to log in and visit remotely. Through the introduction of the above key technical theories, the overall environment of system development, the configuration of related software and tools are determined, and the technical feasibility of the overall project of online teaching system for college English majors is also clarified.

```
def_ init_ (self, criteria, samples):
    self.RI= (0,0,0.58,0.9,1.12, 1.24,1.32, 1.41,1.45, 1.49)
    self.criteria = criteria
    self.samples= samples
    self.num_ criteria = criteria shape[0]
    self.num_ project = samples[0]. shape[0]
def calculate weights(self, input_ matrix):
    input matrix = np.array(input_ matrix)
    n, n1 = input_ matrix. shape
    assert n==n1, "the matrix is not orthogonal"
    for i in range(n):
        for j in range(n):
            if np. abs(input_ matrix[i,j]*input_ matix[j, i]-1)> 1e-7:
                raise ValueError("the matrix is not symmetric")
```

3   Function Realization

3.1   Student Client

1) **Online Learning**
   Different from the traditional classroom teaching, the course content setting in the platform can not only refine the conventional English teaching content, but also further enhance the pertinence of the courses, such as English in the Workplace (Science and Engineering) and English for Studying Abroad. In addition, the system also brings many excellent extracurricular teaching resources into the curriculum system. Network online learning can effectively broaden students' horizons and promote students' personalized development.

2) **Question bank and training**
   The item bank subsystem is preset in the system, which contains various types of questions in CET-4, CET-6, TOEFL, IELTS and other professional examinations, so that students can conduct online simulation tests conveniently. The realization of this function mainly depends on the data interface between the front-end interactive page and the back-end function control of the platform, such as self. Single = singlehoicesubject () and self. Single list = self. Single. Getdata (), which represents the selection, publishing and answering of multiple-choice questions and the declaration and definition of data recovery interface and method. [8] For the five abilities of English listening, speaking, reading, writing and translation, the system can provide various types of situational and case-based virtual scenes, which can promote the organic combination of the five abilities and comprehensively improve students' English quality and teaching effectiveness in training.

Table 1. Statistical table of live course data

Target layer	First-level criterion layer	Second-level criterion layer
Learning effect score	Learning attitude A_1	Use time A_{11}, Use frequency A_{12}, Use duration A_{13}
	Learning process A_2	Course completion degree A_{21}, Expand resource learning A_{22}, Study duration A_{23}
	Learning ability A_3	Test results A_{31}, Training results A_{32}, Communication times A_{33}

3.2 Teacher Client

When teacher users log in to the system, the main work includes three parts: student management, curriculum resource management and assessment. Under the assessment module, the system will automatically collect the application data of online learning of student users, and combine with the established evaluation criteria of learning effect to automatically complete the assessment and scoring work. As shown in Table 1, it is an evaluation index system. Under this index system, teachers use the AHP algorithm model preset by the platform to determine the corresponding weight values of each index. [9].

The platform compares each index value in pairs to determine its importance, and completes the construction of judgment matrix according to the provisions of comparative quantized values, as shown in Formula 1. According to the judgment matrix, the row elements are normalized by columns and then summed, and the row vectors obtained are normalized twice to get the ranking weight vector w, and the corresponding weight $\lambda_{\max}$ is calculated by the sum-product method, as shown in Formula 2. [10] After the weight of each index value is determined, the teacher scores and calculates the students' learning effect score, as shown in Table 2.

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \tag{1}$$

$$\lambda_{\max} = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} \tag{2}$$

Table 2. Results of student online learning outcomes assessment

Target layer	First-level criterion layer	Second-level criterion layer	Weighted value	Single score	Score
Learning effect score	Learning attitude A1	Use time	$A_{11} = 0.051$	80	78.41
		Use frequency	$A_{12} = 0.103$	85	
	Learning process A2	Course completion degree	$A_{21} = 0.079$	73	
	Learning ability A3	Test results	$A_{31} = 0.174$	66	
		Training results	$A_{23} = 0.081$	77	
	…	…	…		

4   Conclusion

In order to promote the reform of college English teaching mode in colleges and universities, this paper aims to solve the problems of low interest in learning, weak application ability and poor teaching effect, and constructs a Web-based online teaching system for college English majors with the help of the practical characteristics of network information technology, database technology and computer application technology. It further improves the construction of college English education system and realizes the innovative practice of college English network teaching path.

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