



# The Construction of Online Learning System of Ideological and Political Education in Digital Electronic Technology Course Based on FLASK

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**Abstract.** In view of the urgent problems such as the single teaching mode of digital electronic technology and the outdated teaching content in China, the online learning system constructed in this paper will take computer equipment as a server, and introduce Flask framework into Pycharm to create an independent development environment. The overall development of the system is based on Linux operating system, with CentOS release as the version, Python 3.6 as the project development language, Nginx server as the Web server, MTV mode as the main design mode, MySQL5.7 as the database server to complete the system database construction and support. During the operation of Flask framework, the system needs to follow WSGI protocol. WSGI Server adopts wsgi communication protocol between uWSGI server, Flask and implementation to ensure the transmission of user request and response results. In the whole operation process, uWSGI server and Nginx server jointly complete the response to the user's request, so as to improve the overall performance of the online teaching system for ideological and political education of digital electronic technology course.

**Keywords:** Flask framework · PHP language · ideological and political education in curriculum · digital electronic technology · online learning system

## 1 Introduction

As a basic course for electrical majors, “Digital Electronic Technology” covers a wide range of knowledge and has a large audience. We should give full play to the advantages of the course, expand students' thinking and enhance their sense of national pride and mission. Contemporary college students are in a critical period of thinking development. As an educational implementation base, colleges and universities should also give students active guidance, offer courses on ideological and political education that meet the actual needs, and cultivate all-round socialist builders and successors. Combining the current background of the times with the teaching characteristics of ideological and political education, we should organically integrate digital electronic technology with ideological and political education, clarify the value of the times, deeply understand the basic connotation of ideological and political education, and promote its practical exploration at multiple levels. The purpose of “Digital Electronic Technology” course is

not only to improve students' professional skills, but also to enable students to have the self-restraint and critical ability that electrical professionals should have, so as to grow into patriotic and dedicated comprehensive scientific and technological talents [1]. But for now, there are still some shortcomings in the combination of ideological and political education in digital electronic technology courses. First of all, at this stage, colleges and universities don't pay enough attention to the integration of ideological and political education in courses and digital electronic technology, but only make symbolic mention in the classroom, which has not been implemented in education and teaching, resulting in students being unable to realize the true meaning of ideological and political education in courses. Secondly, colleges and universities lack corresponding teaching materials, and the teaching mode is outdated, which will reduce students' learning enthusiasm in the long run, thus reducing learning efficiency. Finally, the teaching system needs to be improved, and the learning evaluation method is relatively solid, so the overall level of students can't be accurately evaluated by examination alone, which is not conducive to the comprehensive development of students [2].

Based on the above problems, this paper constructs an online learning system for ideological and political education of digital electronic technology course based on FLASK, and makes full use of Internet technology to build a learning environment for all-round training before, during and after class. Online learning system combines the dual advantages of online teaching and real-time teaching in physical classroom, and it is also the concentrated embodiment of offline teaching actively using modern educational technology. Teachers can make use of the resource template provided by the system to create courseware, and can also make use of the classroom exercise function to know the demands of students in time, to make clear the shortcomings of students, and to give targeted guidance and answer questions for students. Students can use the function of the question bank of the system to self-test themselves and improve their learning efficiency.

## 2 Key Technology Introduction

### 2.1 Web Technology

Web is a network service based on the Internet, which provides users with the required operation interface. The core component of Web is webpage, which can be divided into static and dynamic. Static webpages are presented in the form of text, pictures, videos and audio, while dynamic webpages can automatically generate new pages, which is convenient for users to call other Web applications through webpages. As far as current practical applications are concerned, most of them are web pages that combine dynamic and static.

Web development depends on the corresponding technical support. On the whole, Web application is divided into three parts: client browser, server-side business logic processing Web server and subsequent data storage database server. The corresponding Web technologies are also divided into client-side development technology, server-side programming technology and database development technology, as shown in Fig. 1. Among them, the client development technology needs to use HTML, CSS, JavaScript

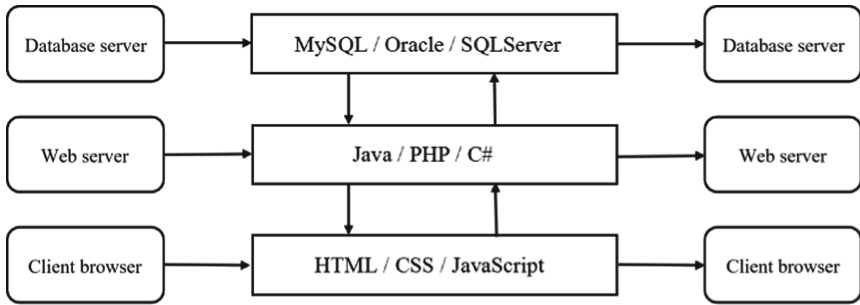


Fig. 1. Web Development technology structure diagram (original)

three development languages, and cooperate with the corresponding framework to complete the design and development of web pages. In the server-side technology, relying on powerful object-oriented programming languages such as Java, PHP and C# and the combination of various development frameworks (J2EE and ThinkPHP) can greatly simplify the development process of the server-side. However, the data development technology needs the cooperation of database servers, such as MySQL, Oracle, SQLServer, etc. [3].

## 2.2 Python

Python is a high-level scripting language that combines interpretive, compiler, interactive and object-oriented. Python language is derived from C language, and has followed most grammar habits of C language. It has core data types such as class, function, exception handling, including list and dictionary, and an extended system based on module [4]. The original design intention of Python language is to be concise and clear, to enhance the readability of code, and to facilitate users to learn and master quickly. Compared with other programming languages, Python's interpretiveness is reflected in the fact that it eliminates the compilation of code in the whole development process, and its usage is similar to PHP language.

## 2.3 Flask Framework

Flask is a lightweight Web development framework based on Python and relying on Jinja2 template engine and Werkzeug toolbox. Flask itself is equivalent to a Web container. Compared with other development frameworks, Flask is more flexible, lightweight, safe and easy to use. The core of Flask framework is composed of Werkzeug and Jinja2. Among them, Werkzeug is used to receive and preprocess Http requests sent by users. After triggering the Flask framework, the system processes the user requests based on the extended functions under the Flask framework, and returns the data results to the users. The overall process is shown in Fig. 2. If the returned result is complex, it needs jinja2 template engine to control and render the template to improve the execution efficiency [5].

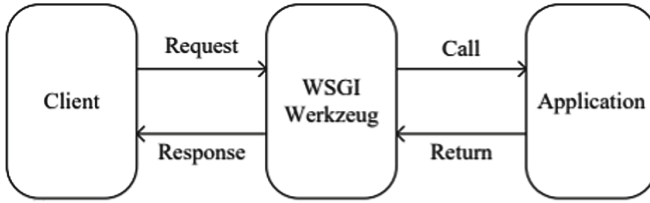


Fig. 2. Flask workflow chart (original)

### 2.4 Development Process

The system requirements and the use requirements of the above key technologies determine the completion of the configuration and deployment of the development environment. The overall development of the system is based on Linux operating system, and CentOS distribution is selected as the version. The Web chooses Nginx server as the middle layer between the underlying data and external services, which can complete static files and handle business logic requests with its powerful functions and performance. At the same time, it can realize the functions of load balancing, buffering requests and responding. The overall design of the system is based on MTV mode, and the database server chooses MySQL5.7 to complete the system database construction and support. Python 3.6 is chosen as the development language, and Flask framework is introduced into Pycharm to create an independent development environment. To install Flask, you need to install Python, pip and other scripting languages first. To install python under Windows, first download the installation package of Python from official website, install Python in the file directory, and then add the files to the environment variable path of Windows. Open the cmd window, you can run Python and complete the subsequent build. During the operation of Flask framework, WSGI protocol should be followed, and WSGI is an interface specification between WSGI Server and WSGI Application which is only applicable to Python language. WSGI Server adopts wsgi communication protocol between uWSGI server, Flask and implementation to ensure the transmission of user request and response results. In the whole running process of the system, uWSGI server and Nginx server jointly complete the corresponding user requests, so as to increase the concurrency of the whole system application and improve the overall performance of the system.

## 3 Functional Implementation

### 3.1 Teacher Side

#### 1) Resource management module

In order to accomplish the fundamental task of ideological and political education, teachers should play a sufficient role. Firstly, from the perspective of instructional design, we should appropriately increase the integration of ideological education and digital electronic technology courses in China. For example, in “Common Operations in Logical Algebra” in the second subsection of Chapter 2, the basic goal of teaching is to enable

students to master the characteristics of logical operations and three basic operations and compound operations. In the process of teaching, teachers can cultivate students' dialectical thinking of whether there is mutual development by citing the positive and negative sides of "0" and "1". Combining with the development of chips at home and abroad, teachers encourage students to study hard on the road of domestic substitution, experience the institutional advantages of our country, and guide students to consult the general situation of digital electronic technology at home and abroad by themselves after class. From the general situation, they can clearly see the current situation and development direction of digital electronic technology in our country, carry out patriotic education, and enhance students' sense of national pride and identity [6]. In "Counter" in the fourth section of the Chapter 6, the teaching goal is to enable students to learn the principles of synchronous and asynchronous counters and integrate the advantages and applications of counters. Teachers can introduce the development of Starr Semiconductor, a local enterprise, in the course of teaching, and then lead to the spirit of Red Boat and Zhejiang, and guide students to make contributions to serving the country with science and technology. Secondly, in terms of teaching methods, teachers can make use of the richness and convenience of network resources to innovate the existing teaching mode. For example, the traditional teaching of digital electronic technology focuses on imparting knowledge in the classroom. Using this system, teachers can make full use of Internet technology to build an all-round training learning environment before, during and after class, so that students can take the initiative to make their own learning plans and cultivate their learning planning ability. Finally, teachers upload courseware to the system for students to learn, and students can adjust the overall progress according to their own efficiency to ensure the effectiveness of learning. The resource upload code is shown in Fig. 3 [7].

```

import sys
import socket
import getopt
import time
upFileName = ""
#Functions on server side
def server_handle(port):
    #Create server socket
    server = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    #Binding IP and port
    server.bind(('0.0.0.0', port))
    #Monitor
    server.listen(10)
    print("[*] Listening on 0.0.0.0:%d"%port)
    while True:
        client_socket, addr = server.accept()
        download_file(client_socket)
#Client function
def client_handle(target, port):
    #Create socket connection
    client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    client.connect((target, port))
    #Convert string file name to byte to send, and socket socket is transmitted by byte
    client.send(upFileName.encode('utf-8'))
    time.sleep(1)
    upload_file(client)
    #Close the file stream after transferring the file
    client.close()

```

**Fig. 3.** Upload code of courseware resources (original)

## 2) Online Q&A module

The ideological and political course itself has a certain significance of the times, and it keeps developing with the passage of time, so it is still difficult and complicated to understand. It is inevitable that students will have doubts in the process of practice and study. Teachers can use this system to get in touch with students in time and discuss solutions to problems together [8].

## 3) Comprehensive evaluation module

Because of the combination of digital electronic technology and curriculum ideological and political education, a single way can't comprehensively evaluate students' learning process and results. Therefore, this system changes the evaluation mode, combining the process evaluation with the summative evaluation to form a multidimensional evaluation mode, so as to meet the actual teaching needs and pay attention to the internalization and extension of the ideological and political content of digital electronic technology courses. The establishment of this module not only improves the authenticity and effectiveness of the evaluation of ideological and political teaching effect of digital electronic technology course, but also gradually improves the overall evaluation system of ideological and political education of digital electronic technology course [9].

## 3.2 Student Side

### 1) Pre-review module before class

In order to ensure the effectiveness of learning, this system specially sets up a preview module before class. Preview before class is an important part of laying a good foundation for subsequent learning, and it is easy to accept in class. In the process of preview, students can communicate with teachers in time through online communication module, and teachers will focus on explaining this knowledge point in online teaching, which is more targeted and can improve students' learning efficiency. Through the online preview module, students can get a general understanding of the knowledge to be learned, which to some extent reduces the difficulty of understanding digital electronic technology. Students' autonomous preview code is shown in Fig. 4.

```
function show - div(menu)
{ var Imgname;
  if(documnant.all.item(menu).style.display = 'none')
  { documnt.all.item(menu).style.display = 'block' ;
    Imgname = "images/Img"+menu+".gif
    D o c u m e n t . a l l . i t e m (" I m g "+ m e n u ) . s r c = I m g n a m e ;
  }
  else .
  { document.all.item(menu).style}display = 'none " ;
    Imgname = " images/Img"+menu+"-1. gif
    documuent.all.i etm("Img"+menu). src = Imgname; .
  < script language = " JavaScript">
  </ scripts
```

**Fig. 4.** Student self-directed preview code (original)

## **2) Autonomous learning module**

The autonomous learning module can be divided into the following three parts in detail: basic knowledge learning, professional ability training and extracurricular expansion. In the basic knowledge learning module, compulsory textbooks are the main learning content. Students can adjust their learning progress according to their own situation, and at the same time, they can learn after class with the help of courseware materials in the data center. Professional ability training mainly focuses on cultivating students' practical operation ability, and then ideological and political education runs through it, with various learning methods and rich contents. It cultivates students' professional skills and enhances students' cultural self-confidence. The extracurricular part focuses on the development of digital electronic technology in China, the development of national instruments and meters, and the spirit of artisans in big countries, so as to stimulate students' enthusiasm, cultivate students' spirit, and make students become high-quality technical talents with comprehensive development of ideas and abilities.

## **3) Practice communication module**

Digital technology is a basic technology course in colleges and universities. Through the study of digital electronic technology course, students' logical analysis ability and practical operation ability can be cultivated. Combining knowledge teaching with ideological and political teaching can help college students form correct ideas from different levels of thinking, develop dialectical thinking and innovative habits, and cultivate college students' view of big projects. Teaching for college students should be put into practice, and students' learning achievements should be tested by practice. In this module, students can actively participate in all kinds of ideological and political education activities organized by teachers, and rely on science and technology to complete all kinds of expanding practice, so as to deepen the study and understanding of ideological and political content of digital electronic technology courses [10]. Then, the students will post the offline homework practice results, experience or learning sentiment to the personal center for other users to comment on. Students' confusion in practice can be communicated with teachers in time with the help of online communication function, which improves the efficiency of problem solving.

## **4 Conclusions**

Curriculum ideological and political education comes from various courses. In the process of implementing education, teachers not only need to constantly explore the ideological and political education elements in the teaching content, but also keep pace with the times and keep abreast of the update and iteration of related technical content, so as to constantly explore the teaching ways and methods of combining the two, introduce famous artists and professions into the classroom, and take example as the motivation to inspire students to work hard. The ideological and political online learning system of digital electronic technology course based on Flask, which is constructed in this paper, integrates ideological and political education into digital electronic technology, innovates a single teaching method, improves students' ideological accomplishment while cultivating their professional skills, and makes students become applied technical talents

with excellent academic performance. In the follow-up research, we will further expand the extensibility and applicability of the system, and make the system function more perfect.

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