The Application of MOOC in the Basic Course of Computer Network

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Abstract. This paper briefly introduces the status of the computer network course, the teaching goal and the allocation of the school hours, and expounds the disadvantages of the traditional computer network education. It describes the thought and theory of MOOC technology. MOOC technology application in computer network course can dynamically and fully tell knowledge, promote experimental teaching and provide related examinations and tests, and effectively promote the teaching of computer network courses.

1. Computer Network Course

The course is the core basic course of the department of computer and software engineering, and it is also the core course of student assessment. It has a very important position. The course highlights the basic principles of the computer network, interprets the concepts related to the network, and reflects some of the latest developments in the computer network. By combining practice with theory teaching, this course will cultivate students' interest in computer networks, enable students to have a more comprehensive understanding of the Internet, and improve their hands-on skills and application skills.

The students in the Department of computer and software engineering of Anhui engineering and information college have to learn this course. There are 64 hours in the course, including 48 hours in theory class, 16 hours in the experimental class, and the main contents and time assignment is like table 1:

<table>
<thead>
<tr>
<th>content</th>
<th>theory</th>
<th>experiment</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>The origin, development and architecture of the Internet</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Physical layer technology and development, transmission media, channel reuse technology</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Data link layer point to point protocol (PPP), broadcast channel protocol, Ethernet, high-speed Ethernet</td>
<td>12</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Network interconnection foundation, internet protocol, subnet division, internetwork control protocol, virtual private network, network address conversion</td>
<td>12</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Transport layer protocol, UDP protocol, TCP protocol</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>The domain name system, the world wide web, the hypertext markup language</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

| summary                                      | 48     | 16         | 64      |

Its teaching aims are to understand the development history of computer networks, various application scenarios, and the performance indicators, classification methods and system structure of computer networks, and understand the basic concepts of the physical layer. Mastering the important concepts of data communication and the main characteristics of various transmission
media, but the transmission media itself is not the physical level. After understanding several commonly used channel taking technologies, we should understand the digital transmission system and understand several commonly used broadband access technologies. Understand the communication protocol and signal transmission principle of point to point channel, grasp the communication mode of broadcast channel, multicast and broadcast communication protocol, and understand the performance of commonly used high-speed network. Master the solution of network interconnection problem, grasp the process and principle of IP communication protocol, understand the Internet control message protocol and several commonly used routing protocols, and understand the virtual private network and network address translation. Grasp the role of transport layer in the whole network system, grasp the implementation and principle of TCP protocol, grasp the principle and implementation of UDP protocol, and grasp the common mechanisms of traffic control and congestion control of TCP protocol. Master the role of application layer in the network system, understand the application scenarios of common application layer protocols and the way of the client server, grasp the role of the domain name system, understand the World Wide Web services, and master the functions of FTP protocol, SMTP protocol, POP3 protocol and DHCP protocol.

The traditional computer network teaching has the following disadvantages: the cultivation of students' ability, especially the cultivation of the ability of innovation. In this kind of education thought and concept, the students only pay attention to the memory of knowledge, and do not pay attention to the cultivation of comprehensive quality and innovation ability. In the relationship between teaching and learning, the teacher's dominance is overemphasized and the subjectivity of the students is ignored. In the course of teaching, the teacher instills knowledge in one way to the students, and the students learn passively, and their subjectivity and enthusiasm are greatly suppressed. Without initiative and enthusiasm, innovation also loses its foundation. In addition, students' demands are too much emphasis on uniformity, neglecting individual differences, ignoring students' personality development, and cultivating students' knowledge and thoughts are also easy to be identical, lacking individuality and lack of originality. In conclusion, this old teaching mode with heavy memory, heavy examination and light innovation has seriously affected the all-round development of students, far from meeting the needs of innovative talents in the future society.

2 MOOC

The so-called MOOC, as the name suggests, "M" represents Massive , unlike the traditional courses only dozens or hundreds of students, a course of MOOCs hundreds of thousands of people, up to 160 thousand people; second letters "O" on behalf of the Open , to interest oriented, who want to learn. You can come to learn, regardless of nationality, just a mailbox, you can register to participate; third letters "O" on behalf of Online, learning on the Internet, no need to travel, not limited to time; fourth letters "C" on behalf of Course, is the meaning of curriculum MOOC is based on the theory of connectedness and the open education of network learning. These courses as the traditional college courses allow students to grow from beginners to senior talents. The curriculum not only covers a wide range of science and technology disciplines, such as mathematics, statistics, computer science, natural science and engineering, but also includes social sciences and humanities. The curriculum does not provide credit, nor is it in a bachelor's or graduate degree. Most of the courses are free. You can also learn the course of the service free of charge and get a certificate. Curriculum is not a collection, but a way of linking the instructors and learners distributed around the world through a common topic or topic. Although these courses are usually for learners and no special requirements, but all the Mu class in a week in the form of this topic, provide a general schedule for the rest of the curriculum structure is the smallest, usually including the weekly lectures, seminars, and reading suggestions etc.

There are frequent quizzes in each course, and sometimes the final and final exams. Exams are usually rated by students (for example, each test paper of a class is scored by five students in the same class, and the final score is average). Some students set up an online learning group, or a face-to-face study group with nearby students.

Its main characteristics are as follows: first, it is a large scale rather than one or two courses
released by individuals: "large-scale open network courses" (MOOC) refers to courses that are released by participants, only those courses are large or large-scale, and it is a typical MOOC. The second is an open course: respecting the CC protocol; only when the course is open, it can be called MOOC. The third is the online course: not face-to-face courses; these course materials are scattered on the Internet. The place of the class is not limited. Wherever you are, you can spend the least money to enjoy the first class courses in American universities, just a computer and a network connection. Stanford University President John said in a commentary recently: "taught by academic master classes in the hall still maintain its high standards. At the same time, online courses have also been proved to be an efficient way of learning. If it is compared with the big lesson, it is more so."

As a product of the deep integration of modern teaching philosophy and information technology, MOOC has the advantages of large-scale teaching and free from time and space constraints. Anyone who can access the Internet can listen to lectures online, follow up tests, discuss and communicate, complete assignments and curriculum examinations. It can also provide the sharing of the whole process of teaching service, which is the network presentation of the ideal classroom. Its advantages include the following aspects:

Firstly, it not only provides free quality resources, but also provides a complete learning experience. It provides high-quality educational resources, and learners can watch videos, share ideas, do homework, take exams, get scores, and get certificates of courses. The MOOC platform covers the whole process of teaching and learning.

Secondly, Network intersecting and instant interaction provide a new platform for knowledge dissemination and creation. On the MOOC platform, the interaction between teaching and learning, learning and learning is not only reticulate, but also immediate. Mesh crossing is conducive to mutual inspiration among large populations. Instant interaction helps to leave sparks of intellectual collision and inspiration flashes, so as to achieve collective purpose of intelligence enhancement.

Lastly, it provides a new and efficient means of support for vocational education and lifelong learning. The MOOC course is open to all personnel, and no threshold is set. Learners do not need to enter institutions, and they can learn courses at anytime and anywhere.

3 MOOC in Computer Network Course

3.1 Dynamic and Detailed Knowledge of Knowledge

MOOC technology can dynamically and accurately display computer network technology by means of multimedia technology such as animation. For example, when teaching communication protocol BGP, border gateway protocol (BGP) is a routing protocol running on TCP. BGP is the only protocol to deal with the size of the Internet, and the only protocol that can properly handle multiple connections between different routing domains. BGP is built on the experience of EGP. The main function of the BGP system is to exchange network reachable information with other BGP systems. The network information includes the information of the listed autonomous system (AS). This information effectively constructs the topology map of the AS interconnected and thus clears the routing loop, while the policy decision can be implemented at the AS level.

MOOC are animated with a clear description of the process of a simple BGP networking in the two AS routers, such as Figure 1.

![Figure 1. Simple BGP Network Diagram.](image)
The production of computer network class, the state conversion of BGP has a clear description, such as Figure 2.

![Figure 2. BGP State Conversion Diagram.](image)

3.2 Promoting the Teaching of the Experiment

The students in the computer network experiment, MOOC will provide detailed guidance, such as the students of BGP network in the H3C router with real time, Mu technology will provide detailed steps and real network, a kind of BGP network diagram as shown in Figure 3, two H3C 2600 routers are located at two AS domain then through the EBGP protocol network.

![Figure 3. BGP Network Physical Map.](image)

MOOC will also provide students with correct and detailed configuration files, such as the BGP part of one of the routers in as 4134:

```
bgp log-neighbor-changes
no synchronization
neighbor 10.0.0.2 remote-as 4809
network 1.1.1.1 mask 255.255.255.255
```

3.3 Provide Relevant Tests

MOOC provide not only for each chapter with thinking questions, but also arrange for some big test, for example, you can set a computer examination questions for the final exam, Mu class system can according to the students' answers according to the steps and accurate to points, greatly reducing the workload of marking, a typical examination questions as follows:
Test: Please follow the configuration in Figure 4 the IP address of the interface, the three layer switch: three layer three layer two configuration corresponding to VLAN and three (with the two connected to the computer, a firewall); configuration related physical interface for access DHCP and NAT; configuration; configuration of OSPF protocol, introducing the direct route, OSPF, Firewall: configuring the OSPF protocol, configuring NAT, introducing direct connection routing in OSPF, configuring static default routing, and sending a static default routing in OSPF. The router can configure the interface address.

4 Conclusion

MOOC is an effective teaching technique, and has wide application prospect in the course of computer network, through the computer network, mu produce excellent, can promote students' learning potential, also helps to strengthen their key knowledge, effectively improve the efficiency of teachers.

References