

## **Analysis and reform of computer experiment teaching in Universities under the new situation**

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*Abstract: Computer courses are very practical, and their experimental teaching is an integral part of the entire teaching process. The article analyzes the problems existing in computer experimental teaching in Universities, and proposes some reform ideas and methods. Improve the quality and efficiency of university computer experimental teaching, and promote students' autonomy and motivation.*

*Keywords: Computer experiment, Experimental teaching, Teaching method, teaching reform.*

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### **1. INTRODUCTION**

Computer course is a practical and highly operational subject. The experimental course teaching is an integral part of the entire teaching process. The mastery of knowledge and the cultivation of abilities depend to a large extent on students' computer experiments. How to meet the diversified interests of learners at different levels through new teaching models and new teaching methods has become a major subject of computer teaching reform in Universities [1].

### **2. CURRENT STATUS OF COMPUTER EXPERIMENT TEACHING**

Our university currently offers computer courses including "Fundamentals of university computer", "Office Automation", "Web Design and Production", "Database Programming", "Multimedia Technology", "E-Commerce", etc. The courses are generally divided into theoretical and Experimental lessons, experimental more than 50%. In recent years, the basic teaching method of computer courses in our university is "teacher's lecturing, multimedia demonstration, student's practicing, and computer examination". With the rapid development of information technology, this method is difficult to arouse students' enthusiasm and initiative in learning.

#### **2.1 Teaching cannot close the gap in students' computer skills**

Teaching in accordance with current teaching methods, unified theoretical lectures, and unified experimental operations have resulted in some students not benefiting from teaching. Most university students come from different regions. Some students have strong computer skills, and some students have weak computer skills. There is a large difference in student computer skills. This will cause some students in the computer experimental teaching to be unable to keep up with the pace of

teaching and become tired of learning, and some students will have a problem of slackness because they cannot obtain new knowledge [2].

### **2.2 Emphasis on theory and less on experiment, students have difficulty in mastering the real talents and have weak application ability.**

Affected by the traditional teaching model for a long time, the phenomenon of attaching importance to theoretical foundations and despising practice and application has always existed in China's higher education. Under the influence of this ideology, it has led to the university's leadership, teachers and students on computer experimental teaching. There is insufficient recognition of importance and lack of correct understanding [3]. In this way, in the course of experimental practice, students can only mechanically imitate the operation steps of the experimental practice, which greatly reduces the mastery of the experimental course. At this time, the experimental teacher often spends a lot of time on solving students' theoretical knowledge vacancies, rather than guiding related experimental lessons [4]. Students can only ask the teacher for help with the problems they encounter, but it is difficult to communicate with the teachers outside of class, and the memory is not deep after mechanical imitation. Most of the students do not know how to solve similar problems in the future, resulting in the effect of the experimental class not obvious.

### **2.3 Exam-oriented education is outstanding in experimental teaching.**

In some computer courses, teachers take provincial (regional) level and national computer level examination syllabuses as teaching syllabuses, and carry out targeted teaching practice activities. Through continuous experimental operations, it can indeed improve the passing rate of student examinations. But this cannot stimulate students' enthusiasm and initiative for computer knowledge learning. Moreover, the knowledge of the examination outline is updated slowly, and some knowledge points are outdated. Under this teaching mode, students only learn mechanically, but do not give full play to their subjective initiative and rich imagination space, which makes university computer experimental teaching lose its charm and function.

### **2.4 It is difficult to identify the workload of online experimental teaching, and the relevant teaching incentive system is lacking.**

Although most Universities have online teaching platforms or various online courses, experimental teaching activities are rarely carried out on online platforms. On the one hand, the development of online teaching by teachers will to some extent break the original teaching schedule, and there will be some unrecognized teaching workloads. When universities do not have a relevant teaching incentive system, online teaching will not be carried out sustainably go on. On the other hand, some network platforms have experimental operation resources, but these resources are often a network of classroom experimental resources. This form does not make full use of the current rich teaching environment, this also obliterates the students' motivation for autonomous learning.

## **3. THE INFLUENCE OF EDUCATIONAL TECHNOLOGY ON COMPUTER EXPERIMENTAL TEACHING IN THE NEW SITUATION**

### **3.1 Current online education and teaching methods are flourishing**

Mass online open courses (hereinafter referred to as MOOC), Flipped Classroom, Micro-lecture and other teaching methods, strategies guide education and teaching reform, and have many successful

experiences. With the large-scale development of MOOC, the cost of education has been greatly reduced, and high-quality educational resources can be widely shared, which has promoted the development of education for all and the reform of teaching in universities. Among MOOC's many courses, computer-related courses account for a large proportion. When an automated experiment is adopted, the learner can complete the experiment online and complete the evaluation and inspection of the experiment automatically. The experimental teacher only needs to arrange the experimental content and experimental verification method. Inverted classroom and micro-lecture teaching is a hybrid teaching method that combines the advantages of traditional learning methods and the advantages of E-learning. It readjusts the teaching organization structure and teaching allocation time inside and outside the classroom, and transfers the initiative of learning from teachers to students. Students learn the key and difficult problems of the course experiment through micro-video before class, and get immediate feedback, which can effectively solve the problem of uneven computer level of students, and improve the enthusiasm and initiative of students.

### **3.2 The mobile terminal has a high Internet access rate, and the ability of students to acquire knowledge has been improved overall.**

According to a survey, 93% of students in our university have mobile terminals and can access the Internet at any time. For general questions in computer experiments, students have more correct answers under Baidu search. Therefore, the computer experiment must have a certain degree of difficulty and levels. When the difficulty is too low, students can obtain the corresponding experimental operation methods by querying the Internet, they will lose interest in learning the course.

### **3.3 Reduced teaching experiment hours**

After several rounds of course system revisions, university computer courses have reduced the number of hours. With the generalization of information technology, computer courses have less hours, and some courses have been reduced by 40-50%. However, at present, many universities non-computer major course textbooks, considering the comprehensiveness of theoretical knowledge, are still designed according to the original number of class hours. Big problem.

### **3.4 The assessment method of some computer courses has changed**

For example, the Guangxi District Computer Rank Examination was cancelled from the second half year of 2014, and the computer rank certificate is no longer a necessary condition for students to graduate. In the original teaching, most of the teaching materials were designed at the level of difficulty. When the district-level examination was cancelled, students could only take the national computer grade examination if they wanted to obtain a certificate. Most students have a desire to obtain a national computer grade one certificate, and some students also want to be able to take a second-grade certificate or higher. In this new situation, how to design computer experimental teaching is also an issue that we need to solve urgently.

## **4. THINKING AND METHODS OF COMPUTER EXPERIMENT TEACHING REFORM**

### **4.1 Create high-quality resources for experimental teaching based on the teaching team**

Organize an elite team that is a leader in various disciplines with a high degree of education, professionalism, strong sense of responsibility, and rich teaching experience. It is responsible for

guiding the teachers of the subject to prepare lessons, strictly control the quality, and organize the development of high-quality teaching courseware (the college must support Economic support and corresponding incentive measures were introduced), and courseware was sent to the online teaching platform in time for sharing [5]. Computer teaching resources are very rich on the Internet and need to be carefully collected and organized by teachers. There are many classes taught in "Fundamentals of university computer". You can refer to this method to achieve more results with less effort. University with mature conditions suggest to purchase computer courses from relevant companies (such as the Superstar Open Course) and take the lead in MOOC teaching. At this time, students in the theoretical courses will learn online on their own and conduct experiments as required. Most teachers in the university are only responsible for experimental guidance and online solutions, reducing a lot of work. After completing the study, the student obtains the grade provided by the business company, which is also recognized by the university.

#### **4.2 Carry out flip classroom and micro-lecture teaching, and create a three-dimensional teaching environment**

Before class, students watch videos, learn some key and difficult problems, and query related materials. In class, teachers focus on solving problems encountered by students during preview, and complete theoretical teaching and teacher-student communication. After class, students complete extended experiments. To carry out the teaching method of flip classroom or micro-learning, you only need to master the relevant teaching theories and use multimedia tools to make teaching videos by yourself, with low difficulty, wide dissemination, and good results. Students can use fragmented time to study on the mobile terminal anytime, anywhere. Even if they don't understand, they can watch it repeatedly until they master it, solving the problem that poor students can't keep up. Some computer courses such as "Database Programming" and "Web Design and Production". Before the class, in addition to recording a certain number of micro-videos for advance learning. In class, the teacher also need to record some software application steps into video for students to review after class.

#### **4.3 Open Computer Lab**

Establish an independent learning platform, an online resource platform, and a free open computer lab for students to study independently, solving the problem of less class time and insufficient learning time. Especially open several computer laboratories for free as independent learning platforms for learning, use existing teaching resources to build a highly shared network resource platform, upload computer-related resources to this resource platform, and carry out networked teaching activities. At present, most universities have the hardware requirements for an open computer laboratory. You only need to coordinate the relevant departments and arrange personnel management to do so. The construction of the network resource platform requires relevant teachers to submit the organized resources to the network platform to maximize sharing.

#### **4.4 The experimental teaching content is application-oriented**

Computer is a huge scientific system. For non-computer majors' students, studying computer courses should be closely related to daily applications. On the one hand, we provide FAQs for some common operation contents of students, so that students can inquire about related operation methods; on the other hand, collecting new solutions to some problems and new function operation methods of new

software versions on the network resource platform, Students keep abreast of new features and computer development trends[6][7][8]. In addition, for course experiments such as "Office Automation" and "Web Design and Production", teachers should give students some difficult questions or cases at the appropriate time, and provide the final effect for students to think about what methods and means can be used first, and what Realize the technology, then collect relevant data and complete the experiment step by step, so that you can greatly improve your ability to learn and practice.

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### **REFERENCES**

- [1] Li Shuping, Zhao Jie. Task-driven inquiry computer experimental teaching model [J]. Vocational Education Forum, 2010 (6): 53-55.
- [2] Li Hui. Analysis of University Computer Experimental Teaching Methods [J]. World of Science and Technology, 2014 (18): 107.
- [3] Cha Daogui, Xu Caifang. Innovation analysis of computer experiment teaching in colleges under the credit system [J]. Journal of Jilin Radio & TV University, 2014 (8): 44-45.
- [4] Liu Jinfeng. Questions and suggestions on experimental teaching of "Computer Application Basic Course" in medical schools [J]. Continuing Medical Education, 2007 (33): 62-63.
- [5] Liu Tiansheng, Zhou Zhengcheng. The status quo and reform of computer teaching in medical schools in southwestern ethnic regions [J]. Journal of Youjiang Medical Universities for Nationalities, 2013 (3): 408-409.
- [6] Yang Xiuying, he Xianjiao, Zhao Shanmin, et al. Questionnaire survey and Analysis on the application and demand of online courses of physiology -- Taking Youjiang College of ethnic medicine as an example [J]. Journal of Youjiang College of ethnic medicine, 2011,33 (4): 556-558
- [7] Zhao Yan, Jiang Zhenlian. Research on the construction and application of network courses in Guangxi Universities [J]. China audio visual education, 2008,61 (8): 55-58