Course Reform of Fundamentals of College Computer based on SPOC

TIANYONG GUO

ABSTRACT

Aiming at the series of problems in fundamental computer course, such as the course content is fixed, the update speed is slow, introduced the current popular SPOC teaching pattern, which lets the students to self-study the online course. It is not only improved the ability of study independently, but also expanded the knowledge; at the same time, make the micro video according to the key and difficult points of the selected textbook and problem sets et al. The practice prove that the new teaching method improves the student’s enthusiasm for learning, and achieves the goal of active learning and autonomous learning, and the teaching quality has been improved obviously.

KEYWORDS

SPOC, teaching method, computational thinking, group discussion.

INTRODUCTION

Fundamentals of college computer is a compulsory course for non-computer major freshmen, the goal is to make students understand the computers’ basic composition, system structure, principle of operating system, etc., need to master network, office software and other practical application ability. However, with the development of the times, most college students have contacted computer in high school, and even some schools offer program course, such as C, Java, etc. In addition, the teaching materials update speed is slow, even some schools do not change the teaching content for years, but the computer course is not same with other theory courses, the update is faster, with the new technologies or knowledge points emerging each year. Therefore, the computer teaching need to be changed, adopt new teaching mode is inevitable, and the rise of MOOC and SPOC gives it a clear direction.

SPOC is short for Small Private Online Course [1, 2, 3], which is proposed by Armando Fox, who is from university of California, Berkeley. Compared with MOOC, SPOC is more suitable for university students to study, usually adopt hybrid flipped teaching, which combine the MOOC and traditional classroom teaching together, students can autonomous learning through MOOC, while in class, mainly answer questions and discuss some problems that students can’t solve by themselves. Meantime, we can know the students’ grasp situation of knowledge points, to adjustment and improvement the later teaching plan.

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COURSE OBJECTIVE

Since the college stage and high school stage study way and method is different with each other, so the primary purpose of this course is to let students learn self-study, cultivate the students’ active learning enthusiasm and initiative, make the students study and explore with interest, instead of taking the final exam score. In addition, it is important to cultivate students’ ability to use computational thinking to discovery problems and solve problems, mainly in the ability to develop, which including learning ability, using computer skills and so on. The most important thing is to cultivate creative talents, so that students can think in a different way rather than in a rut.

COURSE CONTENT

Almost every university has its own teaching material, so the teaching content and focus of the lecture are different. In order to facilitate students’ comprehensive understanding and learning the computer basic knowledge, let the students participate in multiple MOOCS with the teaching materials, and appoint the key important chapters to help students have choice and plan to study. This curriculum conventional content including: development history and the main parameter index of computer, computer systems, operate system, office operation, multimedia technology, information security, network knowledge and application [4, 5], etc.

According to the students’ basic knowledge and interest, the course content divided into relatively independent modules for students to choose. Fig. 1 shows the detail content.

Basic module is the content of the students have to learn, in addition to the conventional content, computational thinking is including in it [6, 7], which is proposed by professor Jeannette M. Wing, the purpose is to develop a habit, a kind of like a computer scientist thinking habit. While the multimedia module and application module as extension module, students can choose parts content to learn according their own interest and energy. However, the extension content is restricted by class hour, this part is introduced by specific cases, to give students a thinking to avoid too many detours.

Fig. 1. Computer course content modules.
TEACHING METHOD

Due to the limitation of periods and faculty, the computer public basic courses are usually adopted the “large class teaching, small group discussion” teaching method, students are given more opportunities to learn while ensuring that the class hour remain unchanged. Fig. 2 shows the teaching arrangement.

The first lesson is usually large class teaching, we tell students the teaching method and requirements, and will give the assignment, students need to seek useful information, watch teaching videos, do exercise, finally find the problems and solve them. Next lessons are several small group discussions, we discussed the problems that all students may encountered. Then start the second large class, to summarize the problems of the first stage and arrange the next stage of the study.

There are usually four ways to solve the problems:

1) students solve the problems by themselves through efforts;
2) discuss with classmates, together to solve the problem;
3) seek help from Internet or consulting others, finally solve the problem;
4) wait until the small group discussion, to solve the problem;

At the beginning, we let the students to make s simple statistics, record your solution method belongs to which one from above four. After a semester of study, you can find that if there are changes or not, which also reflect the students’ attitude of study, active learning or passive learning?

With the depth of the course, the content becomes more and more complicated, the content of the discussion will change from shallow to deep, which put forward higher demand for teachers to prepare lessons. Teachers need to spend more energy and time to carefully prepare the variety of related issues that raised by students.

GROUP DISCUSSION

Group discussions are usually conducted in the computer room, so that the students are not only can master the theoretical knowledge, but also have practical hands-on opportunities. Such as, when talking about the number system in computer, there are binary, octal, decimal and hexadecimal. We discuss that how to convert from different number system to others number, take octal conversion to hexadecimal as example. Table 1 shows the conversion method.

<table>
<thead>
<tr>
<th>Source</th>
<th>Transition</th>
<th>Transition</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octal</td>
<td>Binary</td>
<td>Binary</td>
<td>Hex</td>
</tr>
<tr>
<td>Octal</td>
<td>Decimal</td>
<td>Decimal</td>
<td>Hex</td>
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<tr>
<td>Octal</td>
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We can find that the first method is simple and efficient, and solve it quickly through theoretical calculation. At this point, we ask a question, how to solve this conversion using program algorithm, in other word, how is the computer implemented? We hope that this question can inspire the students’ interest.

The group discussion is mainly to allow all students to participate, let students to take the initiative to think, the first speakers will be relatively simple, but with the depth of the discussion, you need to carefully considered, we often encourage the students to speak, and don’t be afraid of mistakes, there must be curiosity and innovative thinking. We hope that students can be inspired through other classmate speak, to have new ideas, the learning effect will be obvious changed. Students who are not active in speaking, we specify them to start our discussion, to develop their ability to think and express themselves slowly, which is one of the most important abilities for colleges students. For active students, we offer more opportunities to summarize the discussion, which is also a kind of exercise for them.

Finally, we provide the student’s corresponding results, according their situation of speaking and performance. Take this as a simple means of incentives or competition, to inspire student’s desire to show themselves.

**SCORE ASSESSMENT**

The final scores of the course are composed of multiple parts, including the final test scores, the usual test scores, the group discussion performance, assignments and attendance results. Table 2 shows the percentage of the final score.

In order to guide students to self-study, we suggested improving the percentage of the performance in small group discussion, such as 35%, and give the students excellent assessment because their good performance in classroom, even do not need to join the exam.

If students want to get ideal score, they should word hard in every link, no pains, no gains. What is more, we need to guide students not to pay much more attention on the final results, should enjoy the learning process and the accumulation of knowledge.

**CONCLUSION**

The curriculum reform has changed the traditional situation, such as the enthusiasm in class is not high and the teaching effect is not ideal. Students can take the initiative to use micro video to learn, and actively to express themselves, find problem and solve them. Class discipline and the spirit of the students have obvious changes. Of course, students also pay more time and effort.

<table>
<thead>
<tr>
<th>TABLE 2. SCORE PERCENTAGE.</th>
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<tr>
<td><strong>Final test</strong></td>
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<td>40%</td>
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ACKNOWLEDGMENTS

This work was financially supported by Nankai University teaching reform project fund.

REFERENCES