Online Platform Based Discussion Organization of Basic Principles of Concrete Structures Course

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Abstract. This paper discusses a new organizational pattern for the discussion class of the basic principles of concrete structures. The proposed new pattern is based on flexible mechanisms such as online answering, discussion and evaluation, via use of the discussion modular of online learning platforms. The objective is to replace oral answers with text input and relieves students' nervousness and stimulates students' enthusiasm for participation, and thus avoid the situation in which teachers dominates the discussion or only a small number of students actively participate in classroom discussions. Results of organizational practices shows that students have a high acceptance of this discussion pattern, and the enthusiasm to participate is obviously increased than traditional in-class discussion, and can gradually improve and form a correct understanding of the relevant knowledge points.

Introduction

The basic principle of concrete structures is one of the important basic courses of civil engineering. The teaching purpose is to enable students to understand the basic principles of the mechanical performance of reinforced concrete (RC) components and to master the analysis and calculation methods [1]. Current teaching methods usually include in-class teaching and discussion, as well as after-school exercises. Classroom teaching mainly relies on teachers to use a variety of teaching methods rationally based on the cognitive law, while classroom discussion emphasizes students' participation and input. Relatively speaking, the effect of the discussion course on the basic principles of concrete structures is poor, and the research on its organization and teaching skills is relatively rare.

The main factors that affect the discussion effect of the course include not only the particularity of the course itself, but also the personality of Chinese students, who are often shy about discussing in public. The latter is mainly manifested in the fact that while western students are braver to speak, daring to question the authority, Chinese students hesitate to speak in front of teachers out of awe and generally do not like to express their opinions in public. This often leads discussion session either too dull or end up in a ask-answer task mode, or limited discussion within a small number of active students, but not to benefit all students.

From the intensive interaction of various online communication platforms in China, we can see that modern Internet technology and online discussion mode can promote the initiative of our students to answer questions and open discussion to a certain extent. In recent years, online teaching platforms for higher education have emerged, and the relevant platforms often include discussion modular. While such teaching platforms are usually targeted at distant online learning, they can also provide a new platform for in-classroom teaching in higher education.

This paper focuses on the basic principles of concrete structures course to discuss the organization and development of the course discussion session based on the authors' teaching practice. A new model of the discussion session based on online learning platforms is proposed. The results may provide reference for the organization and perfection of the online learning platform and the reform of the relevant professional teaching in higher education organizations in China.
Features of Existing Online Learning Courses

In recent years, in response to the reform of the teaching model of higher education, many online teaching models such as SPOC (Small Private Online Small Restricted Online Course) and MOOC (massive open online) have been proposed at home and abroad [2-6]. SPOC was first proposed and used by the University of California, Berkeley, emphasizing that students carry out self-study in advance and discuss in the classroom, which puts up higher requirements on students' self-study ability [4]. On the other hand, MOOC mainly provides systematic learning resources by universities with better teachers and benefits more students, in or out of universities, and therefore is usually featured by a higher ratio of students to teachers, limited study time, poor real-time learning and higher drop-out rates [3].

In China students majored in civil engineering have to take a lot courses and thus heavy academic burden (students often need to take the basic principles of concrete structures, basic principles steel structures, structural stability and ultimate load, load and structural design and other professional courses). At present, there are still difficulties in large-scale implementation of SPOC teaching. Besides, SPOC itself does not stimulate students' enthusiasm in discussion. Similarly, the MOOC course does not stimulate discussion because of the poor real-time effect (students are often taking the courses at different time).

New Discussion Model Based on Online Platforms

This paper proposes, under the traditional teaching mode (first teaching and then discussion), to organize and carry out online discussion by use of the discussion modular of the online learning platforms, and thus to reduce the requirements on students' self-study ability and at the same time stimulate students' participation in the discussion. The specific aspects of the organization work includes the following:

1. Determination of the time of online discussion to ensure that all students can participate in the discussion at the same time;
2. Set up scoring rules and bonus points to promote student involvement, for example, considering the online discussion at a part of overall attendance and encouraging student commenting and teacher reviewing by bonus points;
3. Design discussion topics according to course contents, and avoid ready-to-answer questions in teaching materials to promote students' thinking and improvising;
4. Summarizing and grading the discussion participation.

Case Study of Online Discussion Session

The authors organized online discussion sessions for the basic principles of concrete structures based on the discussion modular of the Chinese Universities MOOC platform. After communication with the class and determination on the discussion time, the authors organized the discussion where the discussion topics (questions) were released in sequence in the online discussion modular, and students answered the questions by posting comments. Meanwhile, the students also commented on other students’ comments, as shown in Fig. 1.

Figure 1. Organization of Discussion Session on Chinese Universities MOOC Platform.
During the discussion, the teachers can at any time reply the students' answers (reply) by responding and commenting, in a way to point out the inaccuracy in the students’ answer or how it can be improved. In addition, teachers can also announce the best answer by “putting on top,” which declares the end of a discussion topic, as shown in Fig. 2.

Students can also modify their answers by following up on their own responses. Meanwhile, students can also post a review underneath someone else's response, or express or object by "like" and "stepping on," as shown in Fig. 3.

In terms of overall effect, there are 35 students in the author’s class, and the author posted in total 8 topics (questions). The number of responses to each question is shown in Fig. 4.

![Figure 2. Teacher Commenting on Student’s Answer and Putting on Top Options.](image)

![Figure 3. Students’ Self-commenting and Mutual-commenting.](image)

![Figure 4. Students’ Participation during the Discussion Session.](image)
It can be seen that each question has more than 85% of the students participated in the discussion. Students also left messages such as "too exciting," "too nervous," and suggested to include the online students together in discussion as for competition. During the online discussion, students used the mobile phones or computers to answer instead of orally expressing by mouth. Such change not only deepened the impression of the relevant concepts, but also exercised professional writing skills.

Conclusions

This paper discusses a new organizational mode for discussion session of the basic principles of concrete structures course in colleges and universities, which is based on flexible mechanisms such as online answering, discussion and evaluation in the discussion modular of the online learning platforms. This new model replaces oral answers with text input, relieves students' nervousness and stimulates students' enthusiasm for participation. One case study shows that students have a high acceptance of this discussion mode, and the enthusiasm to participate is obviously better than the traditional in-class discussion. Students can gradually improve and form a correct understanding of the relevant knowledge points.

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