On Three Essential Parts of SPOC Online Teaching

Zeyan Wang\textsuperscript{1,a} and Jing Yang\textsuperscript{2,b}

\textsuperscript{1}Institute of Science, PLA University of Science and Technology, Nanjing 211101, China;
\textsuperscript{a}witzy2007@163.com, \textsuperscript{b}melodyyj@163.com

Keywords: SPOC; Construction of online resource; online interaction; Diversified dimensions integrated into one assessment

Abstract. The author points out those three essential parts of SPOC online teaching that need to be focused on. Online teaching resources are the foundation of SPOC online teaching. Five categories of online resources are constructed according to the principle of systematization, openness and interactivity. Interaction is the key to online teaching. Three ways of interaction should be applied into practice in accordance with the principle of bi-directional. Online testing is a necessary means to check and assess students’ online learning. We take the mode of “diversified dimensions integrated into one assessment” to form the new-style tests in the light of principle that both learning process and results should be taken into consideration. The efforts of the three essential parts of SPOC are proved by 11 SPOC courses.

1. Introduction

SPOC is the abbreviation of Small Private Online Course. Compared with the MOOC (Massive Open Online Courses), SPOC has the advantage of improving the quality of personalized education, providing courses of quality and sustainability, reassigning the role of teachers and providing students an in-depth study experience. Therefore, colleges and universities favored SPOC \cite{1-4}.

PLA University of Science and technology has developed its own SPOC platform and successively set up 11 SPOC courses such as Advanced Mathematics, College Physics, College English and College Chinese. After two years of exploration and practice, we decided to implement the SPOC online teaching system. Based on the abundant and convenient online teaching resources, we made use of online interactive communication and the process of teaching evaluation to guarantee the effectiveness of learning.

2. Paying High Attention to the Construction of Online Teaching Resources

The online teaching resources are the foundation of conducting online teaching and the key to online courses construction. While constructing resources, it is required to stick to the concept of “student-centered”, that is to say, students arrange their study according to their learning capability, need and interests, and determine learning contents, methods and time on themselves as well.

2.1 Principles of online resources construction

The first is systematization. It requires systematical design to arrange all key points in a course into different learning units and knowledge trees according to the logic sequence. Besides, resources need to be presented in favor of students’ independent study, including videos, pictures, audios and charts etc.. The teaching procedure shall be formulated in accordance with students’ cognitive rules by simulating the genuine teaching process before class, during class and after class to arouse students’ motivation of independent study. Considering all kinds of the disadvantages of students’ learning conditions, such as the shortage of time, the restriction of places, the simplification of methods of learning, the main contents of SPOC shall be presented with key points in the form of micro learning resource. For instance, the conceptions, theorems, methods and applications of mathematics shall be contained in micro learning resource together with the questions, principles, cases and histories of humanities courses. The difficulties shall be explained with vivid examples in life and military cases.

The second is openness. Openness is the fundamental feature of online teaching. Therefore, online resources shall be constructed with open mind and broad horizons. On one hand, the construction of
the resources cannot be accomplished overnight, nor terminated with the end of courses. It is a continuous construction process of absorption and application. On the other hand, the construction of the resources requires joint efforts of all teachers, students and managing personnel. Efforts should be made in the construction of independent subjects and the purchase of necessary equipment for cooperative subjects. All relevant resources of course study shall be offered according to students’ different features and the variation of learning capability, purposes and personal needs, so as to study in various perspectives and promote comprehensive understanding over the same topic.

The third is interaction. In reality, our university has several separated campuses; online interaction on the basis of SPOC has become the main form of teaching interaction. It requires the interaction between students and teachers, students and resources, students themselves and teachers themselves. At the same time, records and assessments for these interactions are needed. Online teachers can answer questions, inspire discussions on certain topics, release teaching materials and appraise students’ online study. Online students are able to scan materials, raise and answer questions and respond to certain discussions. SPOC could present resources in students’ favor to meet the needs of teachers and students. Through choosing proper resources, they can enhance study efficiency by applying suitable teaching and learning procedures.

2.2 The contents of online resource construction

In accordance with principles and characteristics of online resources construction, there are altogether 5 sorts of resources shown in Fig.1 that need to be constructed.

![Figure 1. SPOC resources.](image)

Courses information: including course briefings and criteria, teacher groups, course requirements, syllabus, references and methods of examination. This facilitates students with a better understanding of the courses and teachers before class, and a proper arrangement on the autonomous study.

Knowledge trees: in response to the basic teaching requirements of the Ministry of Education and the HQ, teaching contents are divided into chapters, sections and points, and classified as “core, focus, and common” as well. Specific catalog on teaching contents is created as trees to lay foundation for the development of the resources and the design of teaching.

Teaching material: including basic and advanced teaching materials. The basic materials, such as syllabus, electronic courseware, guidance case, Micro learning resource, videos and cases, are provided to meet the basic needs of study. The advanced materials, including thinking methods, historical figures, innovative experiments, cases and competition documents, are designed to meet students’ need for advanced learning and innovative research.

Question bank: it is an indispensable part of the construction. It usually contains multiple choices, filling the blanks, true or false questions, short answer questions and extended questions, and satisfies the need of students to preview and do the online exercise self-exams and assignments.

Interaction resources: SPOC enables the online interaction between students and teachers with teaching forum and bulletin. The platform regularly collects and completes the discussed questions and published opinions, and takes them as interaction resources into management for teachers and students’ reference.
The actual effects have shown that the construction does not equal a mere upload of teaching files, videos and questions. On the contrary, it demands a scientific design of syllables in accordance with Constructivism theories, a carefully designed guidance case to lead independent learning, to inspire study enthusiasm and efficiency by creating a study atmosphere similar to that of classroom. This effect can be achieved by setting up various kinds of interactions, i.e., discussions and extended questions. The promotion of the interaction between students and resources should provoke the emotional input and provide humanistic care for students at the same time.

3. Attaching Great Importance to Online Interaction

Through interviews and surveys, we learn that 64.9% of students think the biggest problem in current network teaching is that they cannot receive timely feedback from teachers when they encounter problems. If such problems cannot be resolved in time, the enthusiasm of students will be severely weakened, and the students’ initiative to learn will decrease. Therefore, the online learning cannot be a model of “zero monitoring” which enables the students blindly studies without teachers’ guidance. The effective online learning class is not an online self-study class but an autonomous learning class under teachers’ management and guidance.

The network is bi-directional and teaching is interactive. Therefore, the two-way interaction is one of the important features of online teaching, but also the key to online teaching [5,6]. Compared with the interaction in traditional classroom teaching which is mainly conducted through “listening” and “speaking”, SPOC online teaching depends on “reading” and “writing” to interact. The asynchronous interaction by “reading” and “writing” is more conducive to learning than the face-to-face interaction by “listening” and “speaking”. Because during the process of “reading” and “writing”, students interact with the learning group. The students interact with teachers and among students in various forms. This indicates that they cannot discuss course content only; they will achieve comprehensive interaction on the problems, cases and experiments.

According to the different interactive objects, the interaction of SPOC online teaching can be classified into three types:

3.1 Interaction between teachers and students

Teachers and students are the two principle parts of SPOC online teaching, the interaction between which is the most important part of SPOC. Based on response time, the interaction can be divided into synchronous real-time interaction and asynchronous interaction in non-real time. Synchronous real-time interaction refers to students and teachers who use the SPOC platform for interaction through voice, video, text and other real-time Q & A at the same time in different locations. Asynchronous non-real-time interaction refers to the interaction between students and teachers at different times and different locations, who use SPOC platform such as announcements, teaching forums, e-mail and other teaching information, questions and votes to communicate. The two interactive methods can both be achieved by teachers who are on duty on-line every day. Teachers can answer the new questions raised by students, browse the forum content, guide students to actively participate in the discussion, and give bonus to students who perform well. They can also encourage students to interactive with peers online, solve the questions raised by peers and upload a summary post after the discussion of each question.

3.2 Interaction among students

In addition to the interaction between teachers and students, the interaction among students is also very important. Students can interact through teaching forum by discussing issues, sharing resources and experiences to create an active learning atmosphere. What’s more, if we can guide the students to make the interaction smoothly and deeply, innovation will take place and students can draw the conclusion from their own experience. As a result, students’ enthusiasm for learning and initiative will be further inspired. Also students can share learning experience and discuss the issue through the network to form a harmonious learning atmosphere. In addition, students can organize offline
learning activities spontaneously based on the issues they are interested in to further expand their network.

3.3 Interaction between students and online resources

Students’ browsing information, watching video, reading materials etc. are mostly one-way interaction between students and online resources. There is also a more important interaction between students and online resources. The two-way interaction takes place in two aspects. On the one hand, students complete the test questions on the platform, and the platform immediately and automatically help students to check their own learning results. On the other hand, the SPOC platform organizes students’ questions and teachers’ answers in the corresponding question database, and releases questions and answers on the web page according to different requirements. When students submit the problem on the SPOC platform, the platform will make a rational search according to the keyword and pattern matching from the problem. If the problems can be matched to the answers, the platform will send the answers. If the students are satisfied with the answer, they will label the form of answer as “answered”. Teachers can answer questions according to the form of the questions, and they can focus on questions that are not answered or students are dissatisfied. If the question database is resourceful enough, the students can find the corresponding answer immediately by asking the question to platform. This method greatly reduces the number of questions teachers have to answer, and at the same time, it enhances the enthusiasm of students and improves teaching and learning efficiency.

4. Strong Emphasis on Monitoring the Quality of Online Learning and Testing

Testing is necessary for checking and assessing the students’ scores and teachers’ teaching skills. The reasonability of testing methods has effects on students’ learning attitudes and initiatives. It indicates the level of teaching in some way as well. In order to make testing play a complete role in the guidance of learning, which means testing leads teaching and changes students’ learning habit from “being forced to do the homework” to “being passionate to research and innovate”, we take diversified dimensions to form the new-style tests instead of the former one, which “takes the goals of the final test as the judgment criteria”. And the new-style tests mean final course scores are consisted of respective proportions of learning performance, learning attitudes and learning effects.

According to the different nature and kinds of the curriculum including Mathematics, English and Politics, the final evaluation is a combination of class performance, homework, study notes, online interacting, course essay, quizzes and final exams, shown as followed:

Mathematics score \( = 0.4 \times SU + 0.1 \times SM + 0.5 \times SF + ES \)  
English score \( = 0.3 \times SU + 0.1 \times SM + 0.5 \times SF + 0.1 \times OR + ES \)  
Politics score \( = 0.3 \times SU + 0.1 \times SM + 0.5 \times SF + 0.1 \times PA + ES \)  

Where SU means the score of usual performance, SM means the score of Mid-term examination, SF means the score of final examination, ES means the extra scores, OR means the score of oral tests, PA means the score of course papers.

Meanwhile, the score of usual performance (SU) includes homework, written unit tests, online homework, and usual performance in class, online testing, online interacting and others. SPOC’s accounting function calculates and records students’ marks at ordinary times. The SU formula is as followed:

\( SU = 0.2 \times GH + 0.2 \times GU + 0.1 \times GP + 0.2 \times GOH + 0.2 \times GOT + 0.1 \times GOI \)  

Where GH means the average grade of homework, GU means the average grade of unit tests, GP means the average grade of performance in class, GOH means the average grade of online homework, GOT means the average grade of online tests, GOI means the average grade in online interacting.

The performance in class is evaluated by both of the teachers and the students to plus or to minus scores. Teachers should assign one student as the grade recorder at the beginning of the term. The recorder is responsible for recording students’ performance in class in the form of grades. Students who ask or answer questions passionately should be given additional scores. Students who are absent
from school with no reason or sleep in class or do something irrelevant with the class should be punished by a reduction of scores. Every time before the class is over, the teacher will make a summary about this and log data into SPOC.

The online homework and the online testing mainly consist of objective tests. They are evaluated by SPOC automatically.

The grades in online interaction are assessed by teachers through the rate of the numbers of students’ effective posts dividing that of students’ total posts. The effective posts mean the students provided valuable opinions and thoughts about the courses and uploaded valuable sources collected by them. According to the total learning hours of each course, students should post at least one quarter posts of the total learning hours of the course.

To strengthen the monitoring function of this evaluation, the online homework and tests all have time limit. Once the deadline is past, students can no longer upload the materials. This forces students to finish homework on time.

The extra score: Teachers can add no more than three extra points into students’ overall scores based on the evaluation of students’ grades in diversified subjects or scientific innovation competitions related to curriculums, the quality of course papers and reading reports, the contribution to small subject research and so on. And if the scores are over one hundred, they will be turned into one hundred as the final scores.

This new way of testing not only changes the calculation formula, but also replaces the valuator from teachers to the combination of teachers and students to decide the final scores. This method not only reflects the results of learning, but also involves the learning process. Students can search for their own marks at any time, which in turn forces them to put more emphasis on study after class.

5. Conclusion

Since the two years of practicing online teaching, the students primarily form the habit of conducting online learning by using Internet information technology. More and more students are prone to ask questions and discuss with each other the questions raised by teachers and accomplish preview tasks.

The latest questionnaire held after class shows that 87 percent of the students hold the opinion that online teaching is helpful for improving their interests of learning [7]. 92 percent of the students can finish the online homework of the SPOC in time. 85 percent of the students can review what they have learnt through SPOC after class. Take the College Physics as an example, there are more than 1200 questions raised through SPOC. Over 300 forum posts are posted through teaching forums. Also, 48 questions are listed in the public resource database. 16 scientific and innovative papers are written. The students’ grade point averages in autumn semester in 2015 are beyond 1.2 than that in 2014. The excellent rate arises from 17.5 percent to 20.5 percent. The failure rate decreases from 5.2 percent to 3.1 percent. Practices indicate that the online teaching through SPOC has a positive effect on improving the efficiency and the quality of the teaching in class.

6. References


