

Based on MOOC+SPOC Teaching Reform and Practice of Computer Basic Course in University

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Abstract

The emergence of MOOC has attracted wide attention from the educational circles at home and abroad. It is both a challenge and an opportunity for the traditional higher education. With the teaching reform of the course of “College computing” is deepening, MOOC will be introduced into the traditional classroom and through the “MOOC ten SPOC” way to achieve the complementary advantages, which all the quality of teaching is of great significance. This paper takes the “University Computer Foundation” MOOC of Changchun University of Science and Technology as an example. Then this paper introduces the exploration and practice experience of the reform of computer course in University by the way of “MOOC+SPOC”. It uses the hierarchical MOOC teaching content which fuse MOOC with the traditional classroom teaching. It introduce the “MOOC ten SPOC” teaching practice process, to achieve the combination of online and offline, curricular and extra-curricular complementary Hybrid Teaching and which analyzes the students for the evaluation of the curriculum, summed up the “MOOC +SPOC” teaching reform practice experience.

Key words: Computational thinking; University computer; MOOC; SPOC; Teaching method

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1. IN ORDER TO REFORM THE UNIVERSITY COMPUTER BASIC COURSE, WHY WE WANT TO BUILD MOOC/SPOC

1.1 University Computer Basic Course Should Be a Kind of What Kind of Course?

The “University Computer Foundation” course from the “Computer Culture Foundation” to the “computer application foundation” after course stage, until today which has formed in order to calculate thinking as the leading teaching content of the new curriculum. So more and more teachers and students recognize that the creative thinking of the students in the future has an important impact on the calculation of thinking, rather than the use of computers and some of the typical software and which is not just computer language. University computer courses should be taught how to calculate the relationship between people and automatic calculation, how to achieve automatic calculation, calculation system and procedures, procedures are how to write and execute. And how to program to the construction of the algorithm, the algorithm for solving the problem is difficult to solve, computing and social / natural integration, network and data thinking etc.. The above contents are the teaching content which has the enlightenment function to the student, so the university curriculum should teach these contents.

Although we have made clear the teaching content system of the university computer course. However, there are a lot of problems in the course of the course, which is based on the contradiction of “the foundation—time—content”. For example, teaching purpose is not clear, the facts and tools speak more and less thinking, content to explain shallow pan, with the concept of concept, etc., which led to the staff of the university

computer courses have a low level, the role of the wrong understanding. Many schools have a heart reform, but unable to reform. And which is still confused on how to calculate the application of thinking education, still plagued by the status quo of how to improve the quality of education teachers.

How to solve these contradictions, the author believes that from two aspects of the efforts to crack: First from the content system of curriculum teaching we seek the minimum set of teaching content of the university computer course; secondly, from the teaching methods, whether it can be used MOOC/SPOC and other advanced teaching means to break such a contradiction.

1.2 Research Status

MOOC (Massive Open Online Course) is a large-scale online open courses and is generally open to all students in the community courses. SPOC C Small Private Online Course is a small range of private online courses, usually for some schools or some particular students open courses. “MOOC+SPOC” is a kind of online open course based on a certain door MOOC, and it is a kind of implementation model based on MOOC. In the wave of MOOC, whether the construction of MOOC, how to use the MOOC platform to promote teaching has become a lot of teachers concerned about the problem. At present, the Chinese University MOOC platform course is built by 985 universities and national teacher, the construction of a MOOC need to invest in human and financial resources is also very huge. At the same time as the open MOOC, MOOC platform is like a ring. In the same course of the MOOC there is a clear competition, which is also responsible for the curriculum has brought tremendous pressure. However, SPOC has a private nature, only for some students. Therefore, through the “MOOC+SPOC” method to establish SPOC, which is currently the use of MOOC resources for curriculum reform, and can promote the teaching method is a very effective means. With the popularization of MOOC teaching mode, the limitation of MOOC is also presented. Compared with the construction of excellent courses and the construction of MOOC courses, online learning effect is just passable. From the practical application of excellent courses and MOOC courses, the click rate of many courses is very low. A large number of classroom record video, there are very few people interested in. Even if the student school affiliated to the Network Education Institute, especially the students who receive online education, the network courses for the compulsory requirements of the educational institutions are not up to the expected amount of access. The direct consequences of this phenomenon are: (a) students always feel that their knowledge and skills based on the online learning environment is not solid enough. (b) When students participate in the recruitment or job

competition, through the network education to obtain qualifications and degree graduates often suffer from the ability to question. Which has to cause researchers to think: Has the online autonomous learning really happened? What is the effect of online learning? What kind of online learning environment do our students need? This is the problem that the teaching researchers must face up to. In this case, foreign scholars have given a new concept—SPOC, which is corresponding to the MOOC teaching, and put forward the idea of “one kind of small scale private online course”. Whether this idea can solve the dilemma of the current online learning?

2. KNOW MORE “MOOC+SPOC”

The “MOOC+SPOC” is a kind of real teaching promotion means. We should not exaggerate its function and also do not degrade its influence. It just uses the advanced information technology to produce the MOOC platform to support the teaching work of the school teachers. This support and promotion are reflected in the following aspects:

2.1 “MOOC+SPOC” Is the Gathering and Using Platform of Teaching Resources

It can effectively gather all kinds of teaching resources and teaching achievements, which includes a short video teaching; curriculum guidance document; teaching courseware (PPT); simulation exercises and answer questions; discussion; and assessment; teaching materials; complete operation and etc. At the same time, it can be effectively used by these gathered resources. And it can be a large number of students to learn, the number of students may be several times in the traditional classroom.

2.2 “MOOC+SPOC” Is the Support Platform for the Teaching Work of Teachers

Teaching reform involves many aspects, such as individualized teaching, seminar teaching, process and diversified assessment, etc. Its implementation will produce a lot of workload, the platform can effectively realize the automatic data collection, assessment of the automatic evaluation, the results of automatic processing, etc., can effectively support the teaching work of teachers.

2.3 “MOOC+SPOC” Is the Gathering and Management Platform of Teaching Process Data

Now we usually emphasize the teaching process management and the manager can evaluate and improve the teaching through the process of obtaining the teaching process data. Many schools rely on manual submission of data, artificial fill in the data to complete. However, with the help of MOOC+SPOCs platform, so that data

is accompanied by the teaching process of automatic aggregation. Not by teachers or related personnel to fill in, which is more meaningful. The use of these data not only is an important basis for teaching management analysis, but also is an important basis for teachers to improve the teaching process.

2.4 “MOOC+SPOC” Stressed the Common Building to Share, to Promote and Apply

All the colleges and universities which have already participated in the plan will work together to build the MOOC curriculum resources. In the form of “synchronous SPOC”, they share the MOOC curriculum resources. And based on the mode of “MOOC+SPOC+ flipped classroom”, promote the school’s teaching reform practice. With the help of “MOOC+SPOC” promoting the teaching reform of “university computer” course in our university, working together to promote the National College “university computer” courses to enhance the education of computational thinking, all which have made due contributions to the teaching reform of Computational Thinking in our country.

If a course is for students of different levels of different levels, the teaching requirements and teaching methods are not the same. For example, the basis of good students may say it again, in the same hours can be taught more content; However, the weaker students may have to repeat, in the same period of time we must be compressed content to improve the degree of acceptance of students. When the understanding of the students began to improve, they also have the channel to continue to accept more in-depth content of the study. Precisely because of this commonality and differences in the existence of MOOC and SPOC need to be combined. MOOC curriculum content can be built as a benchmark. The SPOC benchmark construction can be based on the characteristics of the course content, which can be higher or lower than the MOOC benchmark content. The so-called “benchmark” refers to a course that should be taught to complete the teaching content, not only the depth of the requirements and the breadth of the requirements. The so-called “characteristics” is not only reflected in the differences in content selection, but also reflected in the same teaching content using different teaching methods; For the different levels of different levels of professional students, the ways of the explaining is differentiated etc.. Through MOOC can guarantee the teaching level, to ensure that each school in the teacher’s level of differences in the situation and make the students accept the high quality course content. Which can promote the realization of educational equity. We can be achieved through the SPOC, the different levels of students’ differences in teaching, the characteristics of teaching, fully mobilize the enthusiasm and initiative of teachers and students learning.

3. THE PROCESS OF “MOOC+SPOC” TEACHING PRACTICE

3.1 Levels of MOOC Teaching

In my school, the “university computer” MOOC content includes 9 stresses. Every talk is designed to divide the level of teaching content, which also is divided into a number of sections. Video contents include conventional knowledge points. In addition we have added 3 plates, which are virtual experiment, knowledge expansion and software application. As a new educational technology, virtual experiment can deepen the understanding of the key and difficult points of the learners. Through knowledge expansion, we can inspire and guide students’ creative thinking and subject interest. Through the application software, so that different universities can be tailored, old and new teaching plan step by step. Such teaching content can meet the teaching needs of different colleges and universities, according to the actual situation of their schools and students, there is a selective reversal learning. In order to carry out online testing and online discussion each section of the knowledge points are carefully designed to discuss the topic. The unit test is designed in the back of each chapter, and the two weeks is also designed, which needs to be evaluated online. The content is the virtual experiment report. Finally organized a final exam.

3.2 Carry Out Online and Offline Teaching Activities for the School

In the autumn of 2015, Chinese University MOOC platform, our school opened the “university computer” MOOC after school, 20 teachers who teach “College Computer Foundation” course tried a hybrid teaching mode of MOOC combining online and offline based on the introduction of high-quality resources for MOOC students.

The advantages of the combination of online and offline based on MOOC are as follows:

- (a) MOOC fragmentation of knowledge, which is conducive to the students did not understand the knowledge points. And after class they can further study. Which can make up for the lack of classroom teaching. In particular, there are more and more complex with the knowledge of the university computer basic course. MOOC resources can provide a strong support for classroom teaching.
- (b) Fragmentation of MOOC knowledge points is not conducive to the formation of a complete knowledge system for students. Classroom teaching is a systematic and systematic guidance to students’ knowledge, so that students can learn more comprehensive content.
- (c) Before class learning MOOC video, you can let the students with problems and focus on listening

to the teacher lectures, which makes learning more efficient and targeted.

- (d) In this way, teachers make the classroom more abundant. Teachers use MOOC for local content of the micro flip and design some of the topics to guide students to think. So this approach is conducive to the focus and difficult to explain the knowledge.
- (e) In addition to the video on the MOOC, there are plenty of discussion questions, quizzes, unit tests and homework, etc.. It provides students with more opportunities to practice, can improve students' learning consciousness.
- (f) Unit test and other operations to allow students to submit a number of times, the design and use of the high scores of students. When students find themselves doing something wrong, you can submit it again and again until you are satisfied with it.

MOOC's biggest problem is that the learning process mainly depends on the students' learning consciousness. Because the student's self-control ability is limited, its study consciousness also has the insufficiency. Therefore, in our school we encourage students to participate in the teaching activities on MOOC by introducing the MOOC score into the final total score.

The course of "University Computer Foundation" is difficult to evaluate the students' learning state through an examination because of the content and the miscellaneous knowledge. Therefore, based on the online and offline teaching methods, we have carried out a wealth of teaching activities, such as MOOC learning, hands-on experiments, the usual operation and final exams, etc.. We use multiple scores cumulative assessment of the way. The final score of this course includes: MOOC study (20%) + final exam in school (40%) + virtual experiment (20%) + school usually work (20%). It is worth mentioning that the proportion of MOOC learning achievements should not be too large and should not be too small. If the proportion is too large, it will cause the student burden too heavy, if too small it is difficult to attract students to participate. The highest proportion of the final examination of the school uniform, because the final exam is the only way to ensure the authenticity of the results of the assessment. But less than 60% shows that if a student usually does not participate in any teaching activities, then even the end of the final marks, the final result of this test is not passed. This design is because that we are thinking of the students to calculate the process of integration into the daily teaching activities, students usually hope to participate in teaching activities.

3.3 The Construction of the Depth of Cooperation, "MOOC + SPOC" Combined With Other Colleges and Universities

After the author and his teaching team in the Chinese University MOOC platform to open the "university

computer" MOOC, we combine 10 colleges and Universities Based on this course to set up the school's proprietary SPOC. The course construction of deep coordinated "MOOC+SPOC" is carried out. Compared with SPOC, the advantages of MOOC are as follows:

- (a) Everyone can easily access the quality of MOOC teaching resources. SPOC teachers do not have to spend a lot of time, effort and cost to record lectures, design a large number of exercises, such as MOOC teachers. Through the way of "MOOC+SPOC", the SPOC teachers can get all the teaching resources in the MOOC curriculum, and make use of it.
- (b) Easy to manage their students, MOOC in the Chinese University SPOC platform is an independent course, you can use the platform to learn the situation of independent data statistics, performance statistics and other functions. It is also convenient for teachers to manage their own school students, to check the students' MOOC scores.
- (c) It can be a simple MOOC coordination of public resources and private teaching resources, teaching resources, SPOC operation, test and discussion areas are divided into two parts: MOOC and SPOC shared exclusive area. And the two organically unified together to provide students with the use of the school's SPOC teachers in the background to maintain the characteristics of proprietary SPOC content, while the content of the MOOC shared area is shared with the same course.
- (d) It can share online teachers and teaching assistants in real time. MOOC has its own teachers and teaching assistants. Therefore, even if the SPOC teachers do not have the time, there will be MOOC teachers or other SPOC teachers as well as teaching assistants to answer questions, to achieve the sharing of online teachers and teaching assistants team. At the same time, because the MOOC is responsible for the operation of a regular release, regular deadline, by the system automatic scoring, automatic statistics, so save the SPOC class assignments and homework time.

4. FUTURE CONSTRUCTION

The results of the teaching practice of "college computer" "MOOC+SPOC" on a large- scale show that with the help of "MOOC+SPOC" mode it can promote the teaching reform of "college computer" course based on Computational Thinking and carry out demonstration teaching, thus promoting the improvement of teaching method and teaching level. Students have the basis of MOOC learning and teachers can be in a limited

classroom time from the knowledge and skills to explain the ability to calculate the training of thinking. Through case study and discussion the students in solving methods and ideas of the abstract, the problem of teaching basis, who can access the computer application in the thoughts of different disciplines, so as to improve the computational thinking ability of students. At the same time of the teaching method of “MOOC+SPOC”, it also brings some problems and technical challenges:

- (a) How to evaluate the subjective questions. At present, the method used is peer mutual assessment, the problem of this approach is to participate in the course of the subjective influence of the staff is too large. In order to avoid the influence of the motivation and performance factors of the participants in peer assessment, researchers have begun to try to improve the reliability of evaluation by computer aided peer assessment.
- (b) MOOC learning and SPOC learning are different. MOOC is an unsupervised learning, SPOC is a semi supervised learning. How to guarantee the learner’s enthusiasm in the MOOC study, and the effective supervision of the teachers in the SPOC study also needs to continue to explore.

SUMMARY

In order to fully realize the goal of curriculum reform, only the mixed teaching model is not enough. The evaluation system of teaching effectiveness, and the organization and evaluation of the experimental process of the University Computer Course on the realistic and practical computer should be designed with the solution.

In addition, teachers team building, teaching process design and other links, which become key roles in the success of the curriculum reform.

REFERENCES

- College of Education, College of Education, and College of Computer Courses Teaching Steering Committee. (2016). *The basic requirements of the university computer basic course teaching*. Beijing: Higher Education Press.
- Leng, J. L. (2015). *Virtual experiment to promote the computational thinking of computer MOOC curriculum working group alliance landing fourth seminar*. University of Shenzhen.
- Li, F. X. (2015). *Based on the idea of collaborative construction of courses in MOOC ten*. SPOC University Computer MOOC Union Course Working Group of the Fourth Seminar, Shenzhen.