# Research on Teaching Reform of Software Engineering Course Under Background of Internet Plus

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**Abstract:** Internet Plus Education as initiated by the Government, has been largely boosting the teaching reform of Software Engineering Course for computer science and application majors. This paper starts from nature and orientation of Software Engineering Course and introduces Massive Open Online Courses (MOOC) into the teaching reform of this course. By analyzing the advantages of MOOC, it highlights the necessity of the introduction and popularization of MOOC under the current educational environment. Then the study discusses the information-based teaching reform method of classroom teaching under the background of Internet Plus, and puts forward the design MOOC in terms of teaching objectives setting and curriculum strategies using. Three parts are involved in strategies using. Firstly, the strategy for teaching resources construction is a prerequisite for the course building and teaching reform. Secondly, the strategy for teaching activity design lies in the core of the application of MOOC. Thirdly, the strategy for teaching process design enables the application to be carried out smoothly.

## 1. Introduction

In the ear of Internet Plus, the opening and construction of educational resources are largely dependent on the Internet. In this context, colleges and universities are bound to be the main force of opening educational resources. MOOC is a form of education that meets the needs of the times. Compared with the traditional online courses, MOOC has a complete curriculum structure, which is especially represented by Small Private Online Course (SPOC) used in college teaching. In addition to providing video resources, textbooks or text materials as well as answering questions online, MOOC also provides learners with interactive communities, learning monitoring and other services while focusing on supporting students' autonomous learning. Based on curriculum resources sharing under the background of Internet Plus Education initiated by the State, the construction and application of MOOC in Software Engineering Course should combine what the society needs for students with what the students are developed to be. The teaching effect should be improved in an all-round way while the students should be trained with the sense and abilities of self-learning and innovation. Besides, the workload of teachers should be reduced and their individual abilities should be developed scientifically and reasonably. [1]

The main purpose of computer science courses offered in colleges and universities in China is to train special talents who can master theoretical knowledge and some basic skills in school and skillfully use computers in work. Software engineering, a compulsory as well as comprehensive course for computer science major, can broaden students' horizons and help them think from different perspectives. This paper introduces MOOC into the curriculum building and teaching reform of the course. The implementation of MOOC in its teaching will largely help to reach the goals in terms of both the teachers and students. MOOC teaching teams can complete the teaching task of the course via video making, explaining and demonstrating supplemented by online and offline discussion and tests, and thus well meeting the requirement of the course construction and teaching reform.

## 2. Nature and Orientation of Software Engineering Course

Software engineering mainly studies how to build or operate and maintain high-quality software in an engineering way. The course of software engineering involves many aspects, such as database, design language pattern, and so on. At present, this kind of software is used in many places, such as our daily e-mail, games and so on. Software, in addition, is often used in the work. For the rational use of this software, not only can improve work efficiency, but also indirectly improve the quality of work. Therefore, it is very important to set up Software Engineering Course for computer science major in colleges and universities in China.

The course of software engineering has three outstanding features. Firstly, it is Abstract because the principles and techniques taught by the subject of software engineering must be placed on specific projects, and some information resources of individual projects are not disclosed, so it is Abstract. It has not reached the height of learning software engineering theory, or there is a big gap between them. But this situation arises because if you want to learn software engineering well, you must put into practice and understand the principle of software engineering in the process of doing the project. Only in this way can you be more impressed with the knowledge you have learned.

Secondly, it is highly practical. As software engineering is dependent on the synthesis of previous research and practice, the course is built on the summary of both successful or unsuccessful examples of large-scale software development in practice. For successful examples, their advantages are presented and studied to reveal how they lead to final success. For unsuccessful examples, the error points are listed to alert later researchers and developers. In addition, software engineering can display its value and function when being used to guide the development of large-scale and relatively complex software other than small projects. [2]

Thirdly, it can show the whole process of software development. It is widely acknowledged that the life cycle of software includes many stages, such as: definition of problems, feasibility study, analysis of requirements, design and maintenance, etc. But the result of each stage will neither immediately affect the project and nor turn out at the stage as soon as relevant work is done. In order to reasonably and skillfully apply the principles, technologies and methods in software engineering to real practical work, it is necessary for students to carry out in-depth study, thoroughly understand the characteristics of each stage and link each stage with each other.

## 3. Application of MOOC in Teaching Reform of Software Engineering Course

### 3.1 Advantages of MOOC

Firstly, MOOC achieves seamless docking in solving the main problems existing in the existing course of Software Engineering. Software Engineering is usually taught in the first semester of a university, mainly for non-computer freshmen. Generally, three or four hours per week (including theory and practice) are offered. Due to the variety of teaching contents, wide coverage and consideration of theory and practice, there are shortcomings in both theoretical and practical class hours. Although adjustment has been made in the process of teaching reform for many years, it has not been fundamentally solved. In this course, the original class hours can only be used for the teaching practice of offline flipping classroom. The main theoretical teaching content and teacher task demonstration are completed by students' online self-learning. Teachers can not only monitor and control learning on the platform of MOOC but also understand the learning effect in online classroom testing and practice. This fundamentally solves the problem of insufficient teaching hours. [3]

Secondly, MOOC can satisfy the development of teachers' personal characteristics in the teaching team of Software Engineering. In order to meet the needs of students and achieve good teaching results, the production team of the course needs to invest a lot of time and energy in the pre-course design. In the course of curriculum operation, the curriculum team also needs to adjust the curriculum dynamically according to the analysis and feedback of learning data. Therefore, teamwork is an indispensable support for a well-designed course. Because of the nature of the

public basic courses, the course of Software Engineering has a large number of students, and indirectly determines the number of teachers participating in the course. This meets the basic conditions of teamwork operation, and also has the basic conditions of role playing in the teaching team of "Software Engineering" based on personal expertise. Some teachers are good at classroom teaching because of their vivid language, well-explained content and strong logic. This can play the role of a video lecturer in the teaching team of the course. Some teachers are good at communicating with students, have enthusiasm and time to answer questions and puzzles actively for students, and can play the role of online question answering and group discussion in the teaching team of this course. Some teachers are good at computer and Internet application skills, and can play the role of "system engineer" in the teaching team. [4]

## 3.2 Design of MOOC for Software Engineering Course

The design MOOC for Software Engineering Course comprises the following two parts.

The first is the setting of teaching objectives. In the early stage of the application of MOOC in the teaching Software Engineering Course, the main aim is to share the application of SPOC course among college students in the co-construction universities. Therefore, it meets the basic teaching objectives of Software Engineering Course in the application-oriented undergraduate colleges and universities, and also takes into account the wider application of the course. That is to say, under the guidance of the corresponding theory of computer science, it is aimed at the learning needs of students at all levels and with difference performance, who are mainly computer science and application majors. [5]

The second is curriculum strategies using. The teaching strategies of MOOC are mainly divided into three parts: teaching resources construction strategy, teaching activities strategy and teaching process design strategy. Firstly, the strategy for teaching resources construction is a prerequisite for the course building and teaching reform. Video resources are the most important of the basic teaching resources. Video time for each course should not be too long. To support mobile terminals such as mobile phones, it is better to add subtitles and provide text manuscripts for learners with different habits to choose. In addition, the syllabus, the teaching process Table, the question bank, the teaching plan or the demonstration manuscript, the key and difficult guidance, the homework, the reference catalogue, the case bank, the special topic lecture, the material resource bank and so on should be provided according to the situation, and the functions of uploading and downloading the above contents should be provided. Secondly, in order to grow the course in the future, the choice of the platform must also meet certain conditions, including at least curriculum announcement and introduction, teacher information, teaching video, learning resources, discussion area, homework submission and achievement announcement, self-test exercise database, etc. [3].

Secondly, the strategy for teaching activity design lies in the core of the application of MOOC. The most important part is how to carry out online exercises, group collaboration, homework assessment, exchange and discussion, interactive question-answering activities, offline activities can only be supplemented. For the application of SPOC in this course, the main teaching activities are students' online self-learning and the activities of discussion, communication, practice and counseling in the flip classroom. At the same time, due to the large number of students, it is impossible to rely solely on the lecturer to interact. Assistants must be equipped according to a certain proportion. When necessary, the teaching team should be managed and divided, while evaluating and rewarding.

Thirdly, the strategy for teaching process design enables the application to be carried out smoothly. This strategy is designed according to the pre-class preparation stage, the teaching implementation stage and the evaluation and summary stage. Pre-class preparation stage is mainly to do a good job in curriculum design, recording teaching videos, selecting suiTable platform for the course. If SPOC is mainly used in the stage of teaching implementation, it should be matched with the school teaching plan. Teaching evaluation includes two parts: the evaluation of learners and the evaluation of curriculum teaching itself. The assessment of learners is mainly composed of two parts: the usual performance and the final assessment. In general, the proportion of

achievements should be larger than that of traditional classroom teaching. The evaluation of the curriculum can be carried out according to various data of learners' learning activities provided by the platform, questionnaires and in-depth interviews with learners, as well as various reflections of the network and the society on the curriculum, which is conducive to making necessary improvements and adjustments in the opening of the new round of MOOC development. [4]

## 4. Summary

Nowadays, with the popularization of Internet applications and mobile terminals, the guidance of innovative education and individualized learning concept, the reform of higher education and curriculum teaching mode are imminent. The introduction and popularization MOOC make the development of science and technology perfectly integrated with the demand of learning, and also brings new opportunities and challenges to the development of education in China. Teachers in Institutions of higher learning and universities should take the background of Internet Plus Education as the driving force to adjust their educational concepts, educational mechanisms, educational contents and educational forms, seize opportunities and make joint efforts, persist in deepening the reform of curriculum construction, and provide high-quality and moody courses for students and lifelong learners, reflecting the social responsibilities of higher education and university teachers. The Internet Plus program reflects the trend of the development of information society and will have a profound impact on education and teaching. With the rapid renewal of teaching concepts and modes under the background of Internet Plus, there are still more specific problems to be explored in the teaching of computer courses.

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