

# Exploration on Curriculum Reform of Software Design Pattern and Architecture based on Hybrid Mode

Lifang Shen

School of Information and Control, Shenyang Institute of Technology, Shenyang, China

## Abstract

After 20 years of development, "Internet +" education has endowed blended teaching with new connotation. How to combine online courses with traditional classes, change the existing teaching mode, fully stimulate students' innovative thinking, and enhance students' knowledge integration and application ability has become an important content of current teaching reform. Software design patterns and architecture course teaching to make students learn software architectural model theory and design principle, deepen the understanding of the basic concept of software design pattern, make them understand the basic principle of 23 species of common design patterns and the use of the environment, enhance the students' practical skills, and able to improve students' ability to analyze and solve problems independently. The design of software design mode and architecture course teaching mode based on hybrid mode not only enriches teaching activities, improves students' interest in learning, improves learning efficiency and quality, but also helps to cultivate students' comprehensive ability and improve teaching quality.

## Keywords

Mixed Teaching; Design Pattern; Architecture; The Curriculum Reform.

## 1. Introduction

In recent years, the national curriculum reform of university teaching widely carried out online and offline mixed research, countries also launched numerous online gold class, through the use of Internet technologies of the characteristics of high efficiency, fast and convenient communication, combining MOOC with SPOC mode and offline teaching form mixed teaching mode, play a great role in promoting the development of modern education. Through the MOOC platform, students can choose the courses they are interested in and study online using the Internet. Small-scale restricted online courses (SPOC), teachers can open SPOC function on the MOOC platform, timely integrate and optimize various online and offline teaching resources according to the actual situation of students, and combine various teaching methods to carry out small-scale online teaching for some students, which is conducive to the effective combination of online and offline teaching. Thus form a mixed teaching model [1, 2].

## 2. Curriculum Present Situation

Computer major is a discipline with strong practicality and rapid development of technology renewal. With the close combination with other disciplines, enterprises put forward higher requirements for the quality of talent training. At present, there are several problems in the teaching of computer courses.

### 2.1. The Curriculum is Lagging

The speed at which new computer technology is updated is different from that of the past. Many colleges and universities are also aware of this, and through school-enterprise cooperation to

achieve school-enterprise joint development of professional talent training programs. Although some courses of the enterprise are embedded in the curriculum system, they are simply replaced without optimizing the allocation of courses in the implantation process[3]. The technological update of curriculum content lags behind, and the internal integration of production process and teaching process has not been realized.

## **2.2. The Reform of Teaching Mode is Insufficient**

The traditional teaching model has always been teacher-centered and students' learning is often passive. Hybrid teaching makes online and traditional offline face-to-face teaching complement each other's advantages, provides diversified teaching channels, enables students to actively participate in learning and inquiry, and effectively monitors students' learning dynamics and status. Due to high maneuverability, specialized courses for computer is very suitable for online teaching, but most of the teachers understanding of mixed online teaching is more shallow, although the use of love, super magnitude online teaching platform construction of the various online open courses, but instead, utilization rate is low, become a mere formality phenomenon exists generally, The traditional teaching model centered on teacher authority has not been significantly improved[4].

## **2.3. The Subject and Method of Evaluation are Single**

Most of the courses of computer majors adopt the teaching method of integration of reason and practice. Teachers are still the only subject of student evaluation, although the usual practical process assessment as a part of the final evaluation, but the proportion is low. The evaluation standard only involves the content of the curriculum and does not give too much consideration to the quality content of students' innovation and other aspects. This traditional single and one-sided evaluation method has hindered the improvement of students' learning enthusiasm and the cultivation of their innovation ability.

## **3. Mixed Teaching Model**

The online and offline mixed teaching mode is an innovative teaching mode that combines traditional classroom teaching with Internet information technology, including two teaching links, namely online teaching link and offline teaching link[5].

Online teaching refers to the use of modern information technology and Internet technology, teachers through the network platform, to provide students with teaching resources for students to study independently outside the classroom. In the teaching process, teachers can record the course teaching content into videos, micro-classes and other forms, and upload them to the network teaching platform or use the current very mature online course resources. Qualified teachers can also combine the development of disciplines and the frontiers of scientific research and record the recent progress of their own explanations into videos or make PPT forms to share with students. In this way, students can take online courses according to their own needs, regardless of time and place.

Offline teaching is the classroom teaching between teachers and students. Teachers need to complete the assigned teaching tasks in a specified time and specific place[6]. Teachers will explain the key and difficult points of the course in detail according to the requirements of the teaching syllabus. Different from the traditional teaching mode in the past, teachers can pass over the content that students have mastered through the online platform and reserve time to explain the questions raised by students during the online learning process in detail, so as to promote the complete mastery of knowledge. It is necessary to assign preview tasks to students in advance, timely understand students' grasp of learning content through the message area, and then adjust their offline classroom content, targeted explanation, and strive to let students absorb the course content to the maximum extent. The implementation of mixed teaching mode

is mainly to establish student-centered autonomous learning mode, which can not only improve the learning effect and efficiency to a certain extent, but also improve students' autonomous learning ability and comprehensive quality.

#### 4. Implementation Plan

In order to ensure the smooth development of the course teaching reform, the mixed teaching reform team should be established first, which is responsible for the overall design of the course group and the project construction of the course content. The platform construction team is responsible for the planning, production, collection and sorting of all kinds of online resources, and at the same time, the appropriate MOOCs platform should be selected to build online courses.

Curriculum design is the core of this course to achieve mixed learning. It mainly includes five kinds of learning activities: teacher lecturing, students discussing, group cooperation, students learning independently, training practice and so on. Among them, lecturing is the main way of traditional classroom teaching, which is a teacher-oriented and student-led teaching strategy. The reason for using this strategy is that many of the chapters in this course are related to software design patterns and the principles and composition of architecture. Teachers' concentrated teaching can sort out knowledge points for students, further establish a complete knowledge system for students, and can highlight the key and difficult points. The discussion type and group cooperation type mainly use the controversial problems, multi-solution problems and the discussion, communication and research of large projects in the course. At the same time, independent learning, training and practice are used to supplement the traditional teaching methods. Among them, autonomous learning is mainly realized through network teaching platform, which uses network learning to strengthen students' basic theoretical knowledge. Do more discussion and explanation in class, strengthen the communication between teachers and students, students and students; Strengthen students' practical ability through practical visits, research and experiments. During the implementation of teaching activities, reading problem solving, brainstorming, data collection, extended reading, case analysis, online testing, role playing, reflection and other forms can be added to increase students' interest in learning.

In the implementation of mixed teaching, the course assessment method gives full consideration to students' process learning and focuses on students' learning process and growth. With the help of the process management and quality control functions provided by the teaching platform, students' learning results, learning attitude, learning process, learning ability and other aspects of the data are obtained, and through the qualitative analysis of big data technology, the diversified comprehensive evaluation results of students' daily learning performance are formed. The final course evaluation consists of online and offline parts. The proportion of final examination is reduced, the percentage of online learning results is increased, and a comprehensive multidimensional open evaluation system combining online and offline assessment, process and result assessment is formed.

#### 5. Curriculum Design

The teaching object of this course is junior students majoring in computer related majors. The learners have a wide range of students and different learning backgrounds. Through investigation and research, the main characteristics of this kind of learners are relatively single learning mode, poor learning autonomy and lack of cooperative consciousness. For such learners, it is necessary to carry out strict investigation, analysis and summary in learning needs, learning content, learning objectives, learning strategies and other aspects.

### 5.1. Focus on Knowledge and Ability Goals

The opening of any course must mean that it bears the requirements of some knowledge, ability and quality in the graduation requirements. The content of software design pattern and architecture is based on 23 design patterns and classical architecture style. Combining case, the sample program different ways to make the students more understanding, such as the definition of software design patterns and architecture, master the design method, the principle of real integration teaching mode so as to prompt students to integrate theory with practice, can use the theoretical knowledge they learned their flexible for software development, enhance the students' practical skills, And can improve students' ability to analyze and solve problems independently.

### 5.2. Focus on the Design of Teaching Methods

To implement teaching implementation mainly through three aspects: one is phase of preparation before class, the students' learning ability each are not identical, at this stage mainly use network learning, students can watch the teacher teaching video on online learning platform, using a search engine query each knowledge point, using social software and curriculum researchers to explore problems of the far space distance. The second is the classroom teaching stage, the role of the classroom is not only to achieve teachers speak, students listen, but also to achieve a variety of exchanges and discussions, so that students can have a deeper understanding of the problem, but also can use a variety of network resources. The third is the after-class consolidation stage, through classroom learning and discussion, students further deepen the understanding of knowledge points, at this time must be timely reflection and summary, you can learn the course through experimental reports and network tests and other ways.

### 5.3. Focus on Assessment Methods

There should be a process of accumulation and improvement in the learning of any course. In order to better improve the quality of students' learning, it is necessary to pay attention to the process assessment. In order to reflect the students' application ability and level, and pay attention to the process assessment to change the teaching mode that the success or failure is determined by the final examination, the assessment of this course is divided into three parts, and the assessment method combining the usual assessment results + online assessment results + final assessment results is adopted. In the first week of the semester, the assessment methods and grading standards of the course will be announced to students. The ratio of the three parts is 3:3:4, which not only strengthens the assessment of students' daily learning, but also carries out the assessment of students' pre-class preview and after-class test through the online assessment. In the course of theoretical teaching, students' daily learning effect is checked regularly in the form of pre-class preview, homework or stage test. The proportion of final examination papers will be reduced, and the final examination will focus on subjective questions to assess students' flexible use of knowledge. After the assessment, the examination results should be analyzed, and targeted interviews should be conducted with the students with low scores to understand why the students' low scores are caused by teachers or other reasons, so as to achieve the purpose of testing the teaching effect, which is conducive to the smooth implementation of the teaching reform and enhance the teaching effect.

## 6. Summary

Under the model of "Internet + education", students' access to knowledge is no longer limited to the classroom, but more to the exploration of learning. Learning through network is the core way to adapt to the rapid development of information technology. Learning how to acquire valuable knowledge from the environment of network is the ability that everyone must have.

So use online (MOOC + SPOC) and offline teaching method of teaching is the students master class content, through a variety of Internet search engine, to deal with the problem raised by under the teacher's class, or answer you don't understand the content, and by using the network notebook, blogs, personal home page, to realize the wherever they take notes. Through the network, students can not only harvest rich knowledge content, but also make adequate preparation for the follow-up course teaching. More importantly, in this process, students have exercised their ability to explore knowledge and solve problems by themselves.

## References

- [1] Xiong Zutao. Design and implementation of mixed teaching mode of software engineering course based on MOOC [J]. Science journal of normal universities,2016,36(03):62-65.
- [2] Yang Jian. Evaluation System and Effect Analysis of Mixed Teaching Mode based on SPOC -- A case study of C language Programming course in Chengdu Normal University [J]. Journal of chengdu normal university,2019,35(08):9-13.
- [3] Zhang Xin, Wu Xiaoqin, Cheng Zhi, Zhang Chen. An Exploration of hybrid Teaching Mode based on OBE in the Context of new engineering: A Case study of Software Engineering [J]. Computer Knowledge and Technology, 201,17(07):167-168+176.
- [4] Zhu Hongjun, Li Xi. Based on hybrid teaching design and practice of MOOC [J]. Journal of computer education, 2019 (6) : 147-151. The DOI: 10.16512 / j.carol carroll nki jsjyy. 2019.06.036.
- [5] Zhao Yi. Research on Teaching Design of Software Design Course Based on Hybrid Teaching [C]// Proceedings of 2018 International Conference on Education Reform, Management and Applied Social Science(ERMAS 2018),2018:250-254.
- [6] Liu Tao, Liu Dan. Output oriented collaborative project teaching mode [J]. Journal of research and practice of computer education, 2021 (10) : 179-183. The DOI: 10.16512 / j.carol carroll nki jsjyy. 2021.10.042.