Research on Design and Practice of SPOC Blending Learning Model for Computer Basic Courses

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Abstract: With the further development of Internet plus education, a number of high-quality online open courses have been built in China. At present, there are some problems in college computer basic courses, such as single teaching mode, insufficient personalized learning, lack of perfect learning support service system and low learning efficiency. This research discusses and designs the SPOC blending learning mode and its support service system combining online and offline, and implements the flipped classroom teaching mode with the main teaching line before, during and after class, so as to stimulate students' interest in learning, promote personalized learning, improve the quality of curriculum teaching, and promote the in-depth integration of information technology and computer basic courses.

1. Introduction

With the development of new technologies such as Internet, big data, artificial intelligence, cloud computing, the deep integration of information technology and education has become an inevitable trend. Online education has been developing rapidly under the background of "Internet plus education". All levels of departments in various countries are promoting the construction of online open Courses such as MOOC and SPOC. Online teaching has become an important supplement to the traditional education and teaching model, and the combination of online and offline blending learning has become a new model and new fashion. In 2020, the global spread of New Coronavirus caused great disaster to people all over the world. At the same time, it promoted the development of online education. Online teaching, which was not restricted by time and space, became the mainstream teaching mode during the epidemic period, and ensured the teaching aim of "suspend classes and not stop learning".

The 2035 action plan for the modernization of education in Zhejiang issued by the CPC Zhejiang Provincial Committee and the provincial government in May 2020 clearly pointed out that

comprehensively promote the informationization of education, build a perfect intelligent education environment, and realize the accurate and personalized supply of high-quality education resources. Promote technology-based teaching innovation and make blending learning and interdisciplinary integrated learning combined online and offline become the normal teaching. Therefore, under the guidance of various policies at all levels and the promotion of the epidemic situation and other realistic educational environment, the construction of online courses for computer basic courses, the design and implementation of blending learning is an important way to deeply integrate information technology and computer basic courses.

2. Current Situation and Problems of Computer Basic Courses

College computer basic course is not only a compulsory public basic course for college students, but also a compulsory practical course for non-computer majors in Colleges and universities. Our university has set up university computer basic courses for a long time, and has formed a professional teaching team of computer basic courses. The course content is constantly adjusted with the development of computers and the policies of higher education authorities. At present, our computer basic courses are mainly divided into three parts, namely basic theory, operation and application and comprehensive cases. The basic theory includes computer introduction, information representation, computer hardware system, computer software system, database technology, computer information security, etc. the operation and application mainly includes windows application operation, word application operation, Excel application operation, PPT application operation, computer network application operation, common software application operation, etc., Comprehensive cases include windows comprehensive cases, word comprehensive cases, excel comprehensive cases, PPT comprehensive cases, computer network comprehensive cases, common software comprehensive cases, etc. See Figure 1 for details.
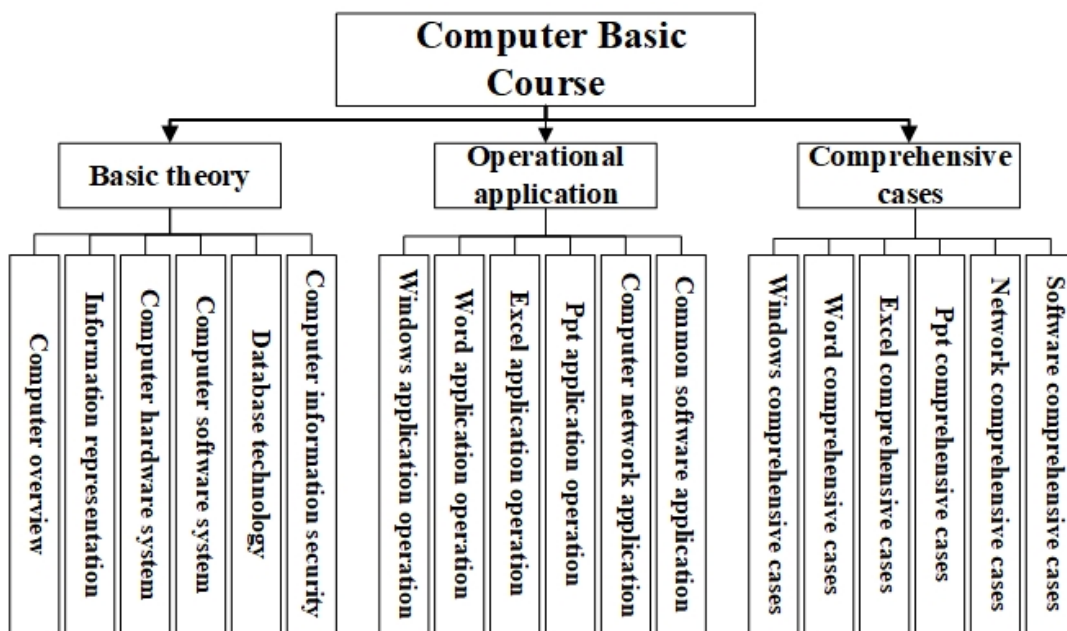

Figure 1: Content structure of university computer basic course.

After investigation and analysis, there are the following problems in the basic computer course of our university.①Single teaching mode and lack of online courses;②The curriculum teaching resources are not rich enough, and there is a lack of interactive channels between teachers and students as well as students and students;③Unable to effectively record student learning process and lack of learning analysis;④The teaching evaluation system is not perfect, and the evaluation means are relatively single. With the continuous promotion of "Internet plus education", the traditional teaching mode based on classroom instruction has been unable to meet the needs of modern teaching. The basic computer courses of university are also facing the challenge of teaching reform. Designing and developing a scientific and reasonable SPOC mixed teaching course is one of the important ways to solve the problem. Therefore, it is imperative to reform the teaching mode of basic computer courses in our university.

3. SPOC and Blending Learning

3.1. MOOC and SPOC

MOOC is a large-scale online open course, which was proposed by Canadian scholars Dave Cormier and Bryan Alexander in 2008. It is a new online course form in recent years. It combines the advantages of traditional classroom teaching, MOOC resources and online teaching platform to improve the course teaching effect.

SPOC is a more refined and niche online open course type developed by American scholars Armando Fox and David Patterson on the basis of MOOC in 2013 The emergence of SPOC (small private online course), namely "small-scale online course", is considered to be the extension and development of Mu course. SPOC is an auxiliary teaching means integrating management, network media teaching environment and network media teaching tools for specific groups and "combination of online and offline" Compared with MOOC, SPOC is more miniaturized and private, more targeted and more flexible. It not only integrates the advantages of MOOC, but also makes up for the shortcomings of traditional classroom teaching, returns to small classroom teaching, effectively reduces the classroom loss rate and improves the efficiency and effectiveness of curriculum teaching.

3.2. Blending Learning

Blending learning is a new teaching method that organically combines the traditional face-to-face classroom teaching method with the online network teaching method, and complements the advantages of the two teaching methods. Blending learning draws on the strengths of traditional teaching and online teaching, improves the flexibility of teaching, improves the breadth and depth of students learning, and can meet the learning needs of different students.

This study attempts to use the teaching concept of SPOC and flipped classroom to build and set up online courses of computer basic courses on relevant SPOC platforms, design and build a blending learning mode based on SPOC combined with offline classroom teaching, design an efficient blending learning support service system, and carry out online and offline Blending learning for computer basic courses.

4. SPOC Blending Learning Mode and Its Support Service System Design

4.1. Design of SPOC Blending Learning mode for Computer Basic Course

The SPOC blending learning mode for computer basic courses adopts the improved flipped classroom teaching mode, organically combines the "leading subject" teaching system design mode (double master "mode) with teachers as the leading and students as the main body, implements the teaching plan according to the teaching main line of" before class, in class and after class ", and takes pre class autonomous learning as the basis, internalize knowledge in class, consolidate knowledge after class, reconstruct the whole teaching process and promote personalized learning.

Before class, teachers determine the teaching objectives and teaching contents according to the syllabus, make and publish teaching materials such as teaching videos, micro courses and courseware, and arrange pre class learning tasks and learning requirements. Teachers track and monitor students online learning process, answer students questions, analyze students pre class learning, adjust teaching plans, and complete offline classroom teaching design. Students enter the SPOC teaching platform to learn relevant contents independently, complete pre class learning tasks, and carry out online discussion, mutual evaluation test and other activities; In class, according to the students pre class learning, teachers design various forms of classroom learning activities such as advance organizers, teaching problems, difficulty analysis, case analysis, group discussion and practical operation, organize learning activities such as project-based learning, inquiry learning and group cooperative learning, conduct in class tests, publish test results, and guide and promote students. Internalization of knowledge, Summarize and evaluate classroom teaching and review the key and difficult points of classroom teaching. Students listen and practice in class, carry out project-based learning, inquiry learning, task driven learning and collaborative learning, complete the learning tasks assigned by teachers, exchange learning achievements with each other in class, and solve difficult knowledge points of the course; After class, teachers assign after-school exercises, online tests and other after-school homework, collect students online learning data, analyze them, evaluate and feedback students learning. Students finish homework after class, feedback learning problems, review knowledge points, and conduct online communication when necessary to further consolidate knowledge. The blending learning mode is shown in Figure 2.
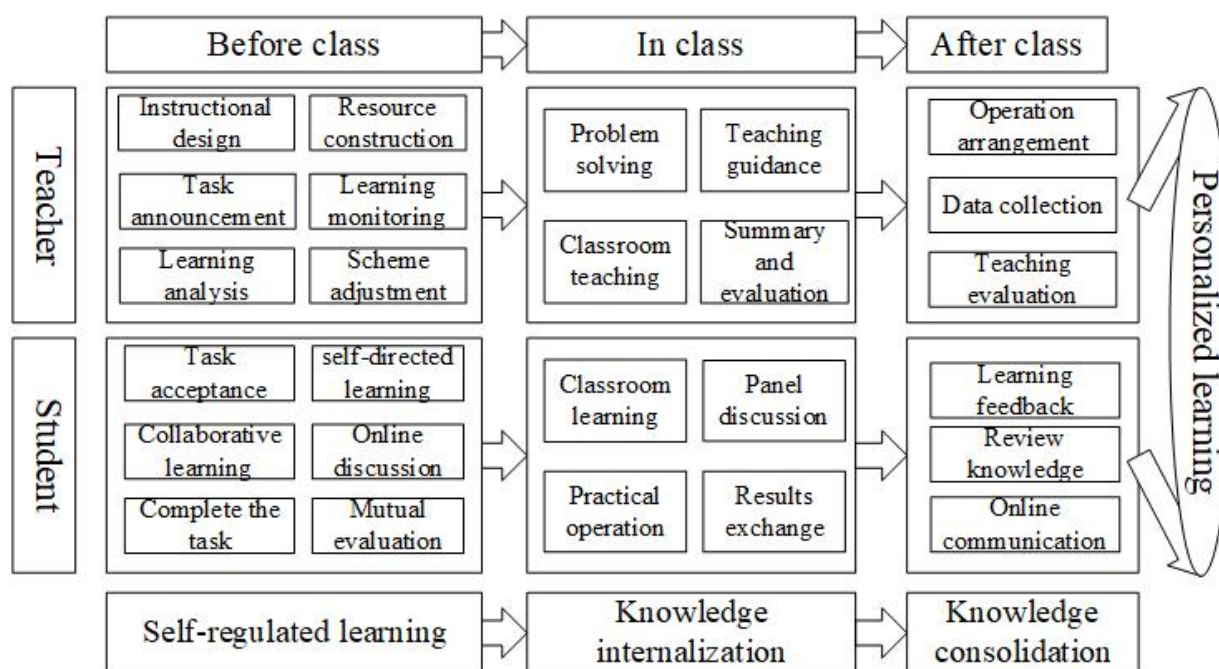
Before class → **In class** → **After class**

Teacher
- Instructional design | Resource construction
- Task announcement | Learning monitoring
- Learning analysis | Scheme adjustment

- Problem solving | Teaching guidance
- Classroom teaching | Summary and evaluation

- Operation arrangement
- Data collection
- Teaching evaluation

Student
- Task acceptance | self-directed learning
- Collaborative learning | Online discussion
- Complete the task | Mutual evaluation

- Classroom learning | Panel discussion
- Practical operation | Results exchange

- Learning feedback
- Review knowledge
- Online communication

Personalized learning

Self-regulated learning → Knowledge internalization → Knowledge consolidation

Figure 2: SPOC blending learning mode for computer basic courses.

4.2. Design of SPOC Blending Learning Support Service System for Computer Basic Courses

According to each teaching step of SPOC blending learning mode for computer basic courses, the corresponding blending learning support service system is composed of online and offline teaching support services. According to the teaching main line of "before class, in class and after class", it is divided into three stages: lesson preparation support service, classroom support service and review support service.

Before class, online lesson preparation support services mainly include class construction, course construction, organization and discussion, questions and answers, learning management, learning analysis, etc. offline lesson preparation support services mainly include lesson plan design, courseware production, environment selection, resource screening, pre class counseling, project design, etc.; In class, online classroom support services include assistance in grouping, real-time questions and answers, online supervision, course management, academic early warning, online evaluation and other links. Offline classroom support services include classroom teaching, organization and discussion, project release, classroom records, practical guidance, summary and evaluation and other links; After class, online review support services include homework correction, report export, performance management, online communication, resource recommendation, online evaluation and other services, while offline review support services include learning analysis, homework correction, teaching feedback, extracurricular counseling and other services. The blending learning support service system is shown in Figure 3. In order to improve the quality of blending learning, learning support service is particularly important, especially the interaction between teachers and students in the process of online teaching is limited by time and space. The design of hybrid learning support service system should pay special attention to the links such as curriculum

resource development, learning analysis, learning supervision and learning evaluation, so as to ensure the personalization and accuracy of blending learning support service.
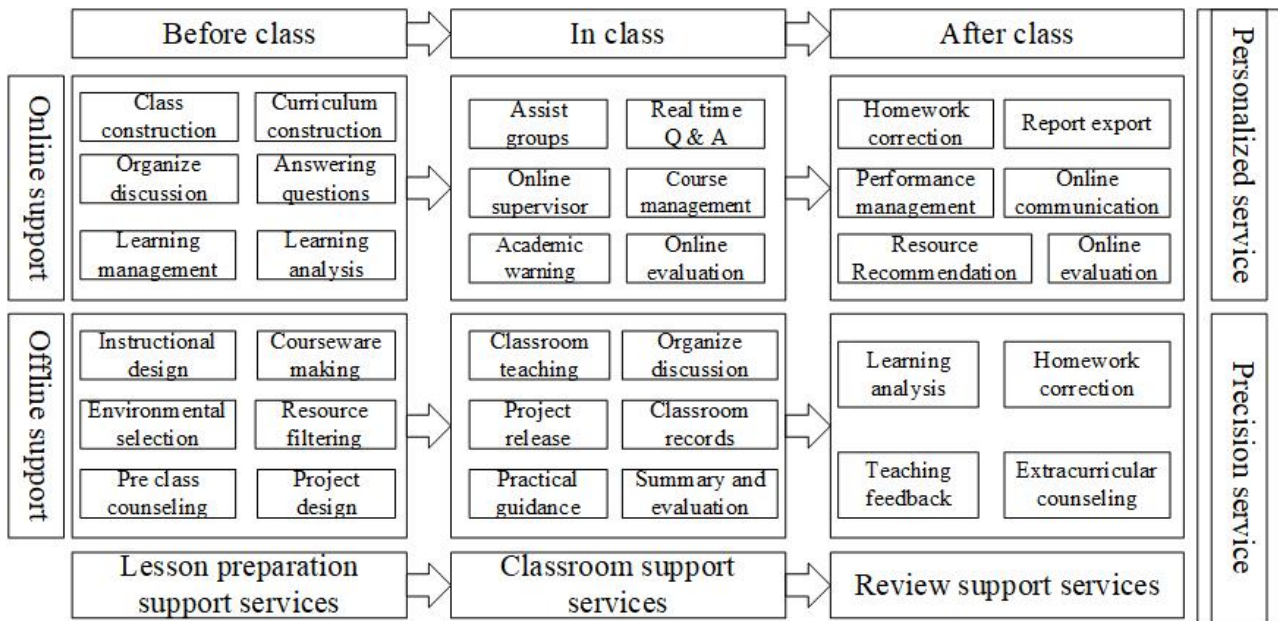

Figure 3: SPOC blending learning support service system for computer basic courses.

5. Teaching Practice and Effect Analysis

The teaching team has built a computer basic SPOC course on a well-known network teaching platform in China. Taking the I study online examination and evaluation system as the evaluation tool, the teaching team has implemented a blending learning mode combining online and offline in the non-computer professional classes of our university, and adopted the evaluation mechanism of 20% of the usual score + 15% of the interim score + 15% of the experimental score + 50% of the final score. Finally, through the analysis of the final examination data, it is found that in the class with a total of 70 students, the number of students with more than 90 points reaches 38, accounting for 54.29%, 26 students with 80-90 points, accounting for 37.14%, and the number of students who fail is 0.Comparing the class performance before the SPOC blending learning mode combining online and offline, it is found that the new SPOC blending learning mode improves the students learning performance in basic computer courses, and verifies the effectiveness of the SPOC blending learning mode designed in this study to a certain extent. The visual analysis of the results of the experimental class of computer basic course is shown in Figure 4.
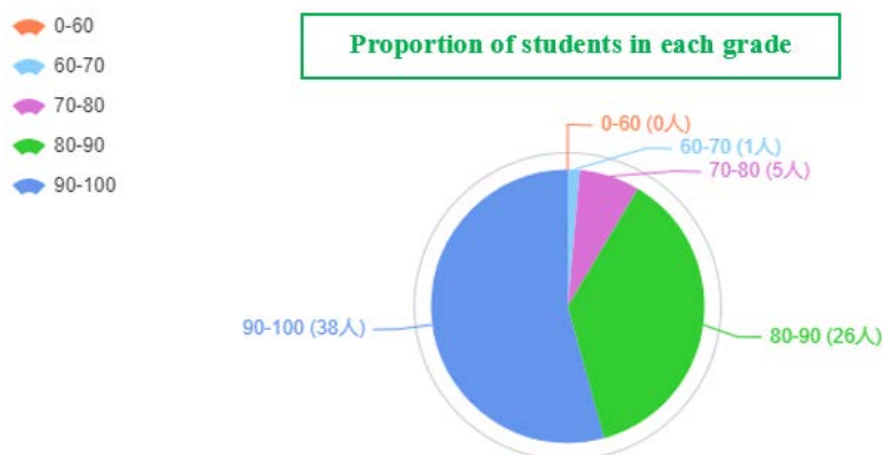
Figure 4: Visual analyses of results of experimental class of computer basic course.

6. Conclusions

Based on the original curriculum, this study constructs SPOC curriculum for computer basic curriculum, takes learners as the main body and educators as the leading, designs and constructs SPOC based blending learning mode and its support service system, takes "before class", "in class" and "after class" as the main line, and takes the flipped classroom teaching mode as the guidance, In the actual teaching process of computer basic courses, the combination of online and offline teaching is implemented. Practice shows that the blending learning mode for computer basic courses is conducive to expanding students learning path, stimulating learning interest, improving learning efficiency and effect, promoting students autonomous learning and personalized learning, and effectively promoting the reform and practice of Blending learning of computer basic courses in our university, It expands and perfects the teaching system of computer basic courses, provides theoretical and practical reference for teachers and managers, and provides guarantee for the flexible teaching of computer basic courses in the post epidemic era. Due to the limitation of time, energy and funds, there are still some problems in this study, such as insufficient practice, not wide application scope and not in-depth empirical research, which need to be further considered and solved in the future work.

Acknowledgements

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