Analysis of the "Student-centered" Online and Offline Blended Teaching Model — Taking the Course Computer Fundamentals and Programming as an Example

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ABSTRACT

This article takes the computer major in higher education institutions as a case study, and based on the new curriculum reform, conducts a comprehensive exploration of teaching methods for the computer major in higher education institutions, in order to create high-quality teaching models and curriculum frameworks. In the new era, teaching models are gradually showing the characteristics of integrating "online" and "offline", and in order to further strengthen the application effect of this blended teaching model and create a "student-centered" teaching system, it is necessary to conduct comprehensive analysis based on actual cases to fully develop course teaching activities.

Keywords: *Blended teaching, Being student-centered, Computer technology, Course analysis.*

1. INTRODUCTION

In the actual development process of the computer major in higher education institutions, quality education centered on cultivating students' independent innovation ability is needed and the teaching model of the computer major in colleges and universities should also be reformed. There is a significant gap between the IT and related industries in China and advanced countries such as Europe and America and there is also a greater demand for the field of the computer major. Therefore, this field is regarded as one of the main ways to cultivate high-quality talents. In practical operations, the key lies in improving the quality of teaching and improving teaching methods. Only by constructing a "student-centered" online and offline blended teaching model can the teaching quality of this major be fundamentally improved.

2. OVERVIEW OF THE DEVELOPMENT OF "STUDENT-CENTERED" ONLINE AND OFFLINE BLENDED TEACHING MODEL

With the deepening of computer major teaching in higher education institutions, the "combination of engineering and learning" and "school-enterprise cooperation" have both been greatly developed, and the quality and efficiency of teaching have also been greatly improved. Adopting diversified educational methods can better adapt to the development needs of students in higher education institutions, enhance their humanistic and professional qualities, expand their employment opportunities, and promote their comprehensive development. In recent years, the application of online and offline blended teaching in education has become increasingly widespread and the emergence of many new mobile teaching software and platforms has greatly improved the teaching quality and efficiency of schools. Especially in certain specific situations, it can fully leverage the advantages of new "compound" talents, but the

cultivation method of "compound" talents must also be adjusted and optimized appropriately.

The online and offline blended teaching model fully leverages the role and effectiveness of a comprehensive teaching model, breaking traditional educational models, mobilizing students' learning enthusiasm, and under certain conditions, achieving dynamic education and improving students' innovation ability. Integrating teaching can reduce students' laziness and dependence, which is the main goal of "student-centered" education work. On this basis, implementing online and offline blended teaching is conducive to improving the quality of teachers and students, fully tapping into the potential of teachers, and fully leveraging their advantages to improve their educational level. In addition, this approach can also stimulate students' thirst for knowledge, stimulate their active thinking about problems, make them actively solve problems, and cultivate their understanding and expression abilities. In the new era, establishing good teacher-student relationships is an important link in improving the quality of teacher-student relationships. Therefore, teachers should strive to play the role of integrated education methods in teaching, create new mechanisms for education and success, achieve a win-win situation with students, achieve the basic purpose of education, and meet current educational needs. To have a student-centered online and offline blended teaching model, it is not only necessary to instill knowledge into students, but also to stimulate learning enthusiasm and exploration spirit. This requires teachers to efficiently utilize various advanced educational methods and means to maximize the comprehensive role of comprehensive education methods, truly achieving a "student-centered" approach, and introducing students into their own classrooms in the form of "good guidance", so that they can actively engage in their own learning and deepen their understanding of subject development. Teaching methods are closely related to teaching quality and are the core of teaching quality. In teaching, the integration of teaching methods not only strengthens knowledge and skills, but also improves students' learning ability and comprehensive quality, making them comprehensive and innovative talents who can adapt to social development.

3. EMPIRICAL ANALYSIS OF "STUDENT-CENTERED" ONLINE AND OFFLINE BLENDED TEACHING MODEL

Due to the involvement of algorithms, design, systems, and many other issues in the computer major, the training of thinking is particularly emphasized in the course Computer Fundamentals and Programming, which can be divided into scientific thinking, algorithmic thinking, and efficient thinking. Firstly, it is a reflection on the essence of science. Scientific thinking is a further extension of structured thinking. In computer fundamentals and programming, it is important to frequently use structured thinking to solve problems. For example, abstract data types and mechanisms such as encapsulation, integration, polymorphism, messaging, and practice in object-oriented programming languages are all based on scientific thinking in code conversion. Secondly, there is operational thinking. Practice has shown that in computer fundamentals and programming, "analysis" and "design" are essential parts, undertaking the tasks of "transformation" and "iteration". However, the importance of "analysis" and "design" should not be too high. If changes in reuse can be judged and considered, it has certain reference value for object reuse in reuse. For example, in interface programming, priority should be given to object merging and aggregation. In algorithmic thinking, it is most important to prioritize elements and avoid secondary design issues. It can be said that the most important part of programming is learning operation. Thirdly, it is to increase revenue. This is a comprehensive, extensive, high-level, and closely related practice. Comparatively speaking, design patterns and software architecture technology are major new technologies in computer fundamentals and programming, which are a development and expansion of construction technology. Only in the integration of construction technology can a good foundation be laid for the development of creative thinking.

It also needs to strengthen the development of online and offline software and platforms. Although this method has not yet been widely applied in colleges and universities, it has gradually become the most important method there. Therefore, the effective implementation of the online and offline blended teaching model in Computer Fundamentals and Programming classrooms of university computer majors is of great significance for

promoting the smooth development of university classrooms and promoting the smooth development of university classroom teaching. However, currently, China has not established an online and offline blended teaching model based on various types of networks. In order to achieve the core goal of being "student-centered" to the greatest extent in the blended teaching model, it is necessary to further optimize and improve the various functions of the online and offline software, configure the relevant technical team reasonably, and promptly handle various problems that arise in online courses, creating a better learning environment for teachers and students.

While implementing a student-centered online and offline blended teaching model, attention should be paid to the innovation of the organizational and teaching methods of "blended" education to overcome the shortcomings of "blended" education. As a brand new educational method that can effectively improve classroom efficiency and teaching effectiveness, "blended" teaching has important theoretical and practical significance. However, blended teaching methods require consistency between online and offline teaching levels, as well as improving teaching efficiency in online classrooms. Therefore, further improvements and optimizations are needed for online teaching. Firstly, it is the update of educational concepts. In the implementation process, it is necessary to change the educational concept of teachers, with "subjectivity" as the main content, in order to improve the educational level of teachers. In online classrooms, teachers should use the materials provided by their students to guide their courses. Secondly, there needs to be changes in educational methods. This new type of blended education approach brings new challenges to teachers. Therefore, before conducting online teaching, teachers should develop a detailed teaching plan based on different teaching contents, in order to stimulate students' learning enthusiasm and enable them to better participate in online learning. According to the characteristics of different students, teachers can adopt different teaching methods. In addition, teachers should establish a sound evaluation system. To maximize the teaching effect of blended teaching model, it is necessary to optimize the classroom summary, classroom evaluation, and other links, and link them with the teaching process to scientifically and objectively evaluate students. Teachers can use online and offline software and platforms to collect students' learning data and status, provide a basis for teaching evaluation, and assist teachers in conducting process assessments. Through the combination of "online and offline" teaching model, the transformation from "teaching-oriented" to "learning-oriented" and from "teacher-centered" to "student-centered" has been achieved, enabling students to fully utilize their advantages, stimulate and enhance their thirst for knowledge, enhance their creativity, and ultimately improve their mathematical level. Teachers should enhance students' autonomous learning ability, strengthen their mastery of theoretical knowledge, and improve the quality of education. "Table 1" shows the specific proportion division of course evaluation.

Table 1. Composition of course evaluation

Evaluation item	Teaching video	Assignment	Chapter quiz	Learning frequency	Online discussion	Classroom attendance	Final examination
Proportion (%)	35	20	15	5	5	5	15

4. EMPIRICAL ANALYSIS OF "STUDENT-CENTERED" ONLINE AND OFFLINE BLENDED TEACHING MODEL STRATEGIES

Based on the previous analysis, the authors have gained a certain understanding of the online and offline blended teaching strategy, as well as the actual changes in this new teaching method. Based on this, they further summarize my teaching practice experience and analyze how to better construct the corresponding teaching framework, laying a good foundation for future development and improving teaching quality.

4.1 Strengthening the Construction of a Framework for Online and Offline Blended Teaching System

The content of computer major courses is very rich, with strong practicality and theoretical significance. By using mobile education software, the classroom content can be maximized and enriched, thereby broadening students' horizons and improving their practical skills. In summary, higher

education institutions should establish a teaching model of "blended teaching", strengthen the combination of "online" and "online", and use the "online evaluation system", "online teaching APP", and "online course supervision" to apply the "blended teaching model" to future teaching, laying a good foundation for the teaching of computer major courses. This new learning method breaks the limitations of time and space and achieves efficient learning with the support of media. In the teaching of the computer major in higher education institutions, it is necessary to establish a high-quality and high-level comprehensive quality training system for higher education institutions based on their actual situation. For example, a certain higher education institution has created a brand new "blended teaching system" using the supernova network system. Teachers and students can easily download various "mock exam questions", "special trainings", "exam syllabuses", "exam outlines", "exam notes" and "e-books" online using their own mobile phones. This article mainly discusses the following aspects: Chapter 1 is a comprehensive and systematic study of students. Teachers can also use the Internet to form online classroom learning groups for students, send materials such as knowledge chapters, points, and key and difficult points to each group, register the number of people checking in, reading time, notes, etc., and conduct online teaching, offering live and recorded classes. In addition, the Internet can also be used to conduct research on relevant theories and students' topics, enhance communication between teachers and students, and better solve students' common learning and personal problems. Taking the course Computer Fundamentals and Programming as an example, this course is divided into several independent parts, which are the parts taught in this course. Based on their difficulty and importance, a targeted design of the teaching process is carried out. The basic grammar section is mainly based on existing textbooks and is learned by students themselves. When implementing autonomous adjustments, students can be divided into several learning groups based on their feedback in the classroom, and students can make autonomous adjustments within different groups. In terms of grammar of case structure and loop structure, students' autonomous learning is also the main focus. For some of the difficulties, such as the role of break statements in switch structures, various loop structures, etc., teachers need to provide detailed explanations based on practical problems. In the advanced parts such as pointers and the combination of pointers with arrays and functions, teachers should give priority to teaching, and appropriately combine some cases to introduce them into teaching to improve students' problem-solving abilities.

4.2 Strengthening the Early-stage Preparations of Online and Offline Blended Teaching System

Before implementing the "student-centered" online and offline blended teaching, every step of the computer major in higher education institutions should be prepared in advance, and a comprehensive and systematic analysis should be conducted on its content, purpose, key points, difficulties, etc., so that students can have a clear understanding of the specific steps, content, and each step of the entire course. Through online teaching methods such as Sojump, WeChat, and Duifene, teachers enable students to better understand the teaching content, achieve multidimensional teaching objectives, and improve teaching effectiveness. Before the start of class, teachers send courseware, micro-course, preview, blackboard writing, key knowledge and other content to WeChat, allowing students to download and learn on their own, which can improve their understanding of the knowledge. Through various educational methods such as Tencent Classroom, Sina.com, and Blue Ink Cloud Classroom, teachers provide students with comprehensive learning guidance. Teachers utilize advanced technologies such as online teaching and virtual teaching to enhance students' computer professional abilities. Under the premise of autonomy, teachers use the "Blue Ink Cloud Classroom" as a platform to develop a new set of teaching resources, allowing students to have a basic understanding of the basic content of this course and to conduct relevant teaching and training according to the various textbooks provided by teachers. Through online questionnaire surveys, teachers can have a comprehensive understanding of students' learning status, accuracy rate, error rate, etc. during the overall teaching process, laying a solid foundation for future teaching. In addition, for a student, a mobile phone is a necessary tool. By developing teaching application software, students can learn in their leisure time, on the road, in the car, in travel and other situations. In response to this situation, teachers have developed a C language teaching program for students to download and learn for free. This stimulates students' enthusiasm for learning, allowing them to connect existing knowledge and newly learned knowledge, so as to achieve

knowledge transfer. With the rapid development of blended teaching, a computer major in a certain university has developed a blended teaching system that utilizes an internal learning APP to provide real-time teaching for students.

4.3 Strengthening the Content Design of Online and Offline Blended Teaching System

When implementing a student-centered online and offline blended teaching approach, the teaching content should be scientifically designed. The essence of online teaching is the use of a large amount of information technology. Teachers can comment on the problems faced by students, analyze them, interact online, and learn. The computer major in higher education institutions is a highly practical subject, and teachers can divide students into several groups and conduct operations online. For example, using mobile education APPs can efficiently integrate multiple teaching resources and quickly identify students' shortcomings during classroom summarization and evaluation, greatly simplifying teaching. With the help of cloud computing and Big Data and other technologies, teachers can fully grasp the online and offline learning conditions of students, conduct scientific education evaluation on students, analyze the problems existing in the education process of students, communicate with students, and let students truly digest and master the content related to the computer major.

5. CONCLUSION

In summary, China is currently in a critical period of deepening higher education. The reform and innovation of educational methods and teaching methods are not only necessary for the development of higher education in China, but also an important way to provide high-quality talents for the vast number of higher education institutions. Especially in the teaching of the computer major, teachers need to establish scientific talent cultivation goals, update guiding ideology, implement teaching implementation guarantees, pay attention to talent development, optimize teaching processes, enable students to better adapt to social development and enterprise needs, and fundamentally create a "student-centered" online and offline blended teaching model.

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