



Research on the Application of Flipped Classroom in Computer Teaching

Haonan Wang

Zhengzhou Business University, Gongyi, Henan, China.

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***Corresponding author:** Haonan Wang, Zhengzhou Business University, Gongyi, Henan, China.

Abstract

As a new teaching mode, flipped classroom has attracted wide attention and application in the field of education in recent years. The core idea is to reverse the learning activities inside and outside the classroom, so that students can preview and study the course content outside the classroom, and use the classroom time for in-depth discussion, practice and cooperation. In the field of computer teaching, flipped classroom is widely used in the teaching of computer science, information technology and other subjects. With the rapid development of science and technology and the continuous innovation of education mode, computer teaching has changed from the traditional teacher teaching to the learning mode of students' active participation and independent inquiry. As an inverted traditional teaching method, flipped classroom has brought new opportunities and challenges for computer teaching. The application of flipped classroom provides more learning opportunities for students, encourages students to actively participate in the classroom, and improves the depth and breadth of learning. At the same time, flipped classroom also provides teachers with more teaching methods and educational resources, making teaching more flexible and personalized. This paper aims to study the application of flipped classroom in computer teaching, in order to provide strong theoretical and practical support for the application of flipped classroom in computer teaching, and promote the continuous innovation and development of computer teaching.

Keywords

Flipped classroom, computer teaching, teaching research

Introduction

As a new teaching mode, the application of flipped classroom in the field of computer teaching has attracted wide attention. With the rapid development of information technology and the wide application of computer in education, the traditional computer teaching mode has been difficult to meet the learning needs of students and teachers' teaching objectives. The traditional computer teaching mode usually adopts the way that teachers mainly teach and students passively accept. Students lack active participation and in-depth exploration in the classroom, and it is difficult for teachers to timely understand students' learning situation and carry out personalized teaching. Flipped classroom just solves these problems and can provide more flexible and personalized teaching methods for computer teaching. The concept of flipped classroom is to reverse the learning activities inside and outside the classroom, allowing students to preview and learn the course content outside the classroom, and spend the class time for in-depth discussion, practice and cooperation. In computer teaching, students can conduct independent learning and practice

through online learning platform, programming environment, network resources, etc., while in class, deep learning activities in the form of programming practice, project practice, teamwork and so on. This mode can stimulate students' interest and motivation in learning, improve the learning effect, and cultivate students' ability of innovation and cooperation. In recent years, many researchers at home and abroad have conducted in-depth research on flipped classroom in the field of computer teaching. Research shows that flipped classroom can effectively improve students' learning interest, academic performance and practical ability in computer teaching, and promote the cultivation of students' independent learning and innovation ability. At the same time, the flipped classroom also provides teachers with more teaching methods and resources, making the teaching more flexible and personalized [1]. However, flipped classroom faces several challenges in computer teaching, such as insufficient technical conditions and equipment support, different students' learning habits and learning styles, teacher roles and adjustment of instructional design. Therefore, it is necessary to conduct in-depth study on the application of flipped classroom in computer teaching, explore its advantages and disadvantages, and propose corresponding solutions.

1. The dilemma faced by the application of flipped classroom in computer teaching

1.1 Insufficient technical conditions and equipment support

The flipped classroom requires students to learn and practice online outside the classroom, and may need to use computers, tablets, Internet and other technical equipment. However, some schools or student families may lack sufficient technical conditions and equipment support, causing students to successfully conduct online learning and practical activities.

1.2 Differences in students' learning habits and styles

Students' learning habits and learning styles vary from person to person. Some students may not adapt to self-learning and practice outside the classroom, and lack the ability of self-discipline and self-learning. They may be more accustomed to the traditional passive receptive learning model in the classroom, and they are difficult to adapt to the flipped classroom learning model.

1.3 Adjustment of teacher role and teaching design

In traditional computer teaching, the teacher is usually the knowledge teacher and instructor, while in flipped classroom, the role of the teacher needs to change from the traditional lecturer to the mentor and mentor, and more attention to the students' learning process and personalized teaching. This may require some teachers to adjust their roles and instructional design, and increase the complexity and difficulty of teaching [2].

2. The Application of flipped classroom in computer teaching

2.1 Improve students' participation in learning

First is preview and learning resources. In the flipped classroom, students preview and learn outside the classroom, contact and learn related knowledge and concepts in advance. Teachers can provide a variety of learning resources, such as online teaching videos, interactive learning platforms, online learning materials, etc., to stimulate students' interest, guide students to actively participate in learning before class, and lay a foundation for in-depth discussion and interaction in class. Second is classroom interaction and cooperation. Flipped classroom emphasizes interaction and collaboration in the classroom. Students can discuss and solve problems together with teachers and students in class, share their understanding and experience, and raise questions and opinions. This way of interaction and cooperation can stimulate students' enthusiasm and participation, making them more actively participate in classroom teaching. Third, explore and practice deeply. Flipped classroom encourages students to deepen their understanding and mastery of knowledge and skills through in-depth inquiry and practice. In class, students can conduct programming practice, software application, case study and other activities, and use the knowledge learned through practical operation and practice. This practical learning method can stimulate students' interest and participation in learning, so that they can more actively participate in classroom teaching. Fourth is innovation and open question discussion. Flipped classroom can guide students to discuss innovative and open questions, encourage students to put forward their own views and opinions, and encourage students to think and express their own opinions. This open

discussion method can stimulate students' thinking, stimulate their interest in learning and participation, and make the classroom become more active and interesting. Fifth is feedback and evaluation. Through real-time feedback and evaluation mechanism, flipped classroom can timely understand students' learning situation and help students find and solve problems in learning. After receiving timely feedback and evaluation, students can better understand their own learning situation, stimulate their learning motivation, and improve their learning participation [3].

The clarity of teaching objectives is one of the keys of project-based teaching. When applying project-based teaching in computer teaching, teachers need to clarify the teaching objectives in the following aspects. First are knowledge goals. Make clear the computer knowledge that students need to master in the project, including basic computer knowledge (such as computer hardware, operating system, network, etc.), programming language knowledge, database knowledge, etc. Second are skill goals. Clarify the computer skills that students need to cultivate and improve in the project, such as programming skills, software development skills, system design and implementation skills, database management skills, etc. Third are practical goals. Clarify the actual operation and practical activities that students need to carry out in the project, including project requirements analysis, system design, coding implementation, testing and debugging, project management and other practical links. Fourth are innovation goals. Clarify the innovation and creativity that students need to cultivate in the project, encourage students to put forward new ideas, solve practical problems, design new systems or applications in the project, and can reflect innovative thinking and methods. Fifth are teamwork goals. Clarify the teamwork ability that students need to cultivate in the project, including the ability of team communication, collaboration, division of labor and cooperation, problem solving and other aspects. Sixth are independent learning goals. Clarify the independent learning and self-management ability that students need to conduct in the project, encourage students to actively participate in the project, think independently, study independently, and form the habit of self-learning and self-improvement. Teachers in the project teaching should according to the subject content, students' actual situation and learning stage, reasonable set teaching goals, clear students in the project should achieve knowledge, skills, practice, innovation, team cooperation and the aspects of autonomous learning, so as to guide students to actively participate in the project, all-round development. At the same time, during the implementation of the project, teachers need to regularly evaluate students' learning conditions, adjust and optimize according to the evaluation results, to ensure the realization of teaching objectives [4].

2.2 Individualization and independent learning

First, learn the pace and the way. Flipped classroom allows students to preview and learn according to their own learning pace and manner before class. Students can choose appropriate learning resources and learning methods according to their own learning progress and learning style, and independently arrange their learning time and learning depth, so as to realize personalized learning. Second is learning content and interest. Flipped classroom provide a variety of learning resources and materials, and students can choose learning content according to their interests and needs. Students can choose the areas of in-depth learning according to their own interests and advantages, and independently choose learning resources and learning paths to realize personalized learning. Third are learning objectives and evaluation. The flipped classroom encourages students to set learning goals before class and evaluate learning outcomes after class. Students can make self-evaluation and reflection according to their own learning objectives and learning progress, so as to adjust their learning strategies and improve the learning effect, and realize personalized learning. Fourth are learning methods and skills. Flipped classroom emphasizes students' independent learning and cooperative learning, and cultivates students' learning methods and learning skills. Students, through independent preview and learning before class, master the methods and skills of independent learning, such as information search, learning plan, learning notes, etc., so as to cultivate students' independent learning ability and learning strategies. Fifth are learning feedback and guidance. Flipped classroom focuses on timely feedback and guidance to students. After the practice and cooperative learning in the classroom, students can get the feedback and guidance from teachers and classmates, so as to understand their own learning situation and progress, adjust their learning strategies and improve the learning effect, and realize personalized learning.

2.3 Highlight practice and application

First, practice items and case analysis. Flipped classroom can enable students to master theoretical knowledge through preview and study before class. And then practice and apply it in the classroom. Students can apply theo-

retical knowledge to practical situations by solving practical problems in class, participating in practical projects and analyzing practical cases. Second are the experiment and the demonstration. Flipped classroom can provide experimental and demonstration resources, allowing students to master the basic principles and operation methods of experiment and demonstration through independent learning before class, and then conduct practical operation and demonstration in the class. Students can deepen the understanding and mastery of the experiment and demonstration in the classroom through practical operation and demonstration, and improve the practical application ability. Third is creative design and development. Flipped classroom can develop students' innovation and practical application by encouraging creative design and development projects. Students can understand the basic principles and methods of design and development through self-study and research before class, and then carry out practical design and development activities in the classroom, and improve the ability of creative design and development through practical operation and practice. Fourth is the practical application of case sharing and discussion. Flipped classroom can help students share practical application cases and discuss them, promoting students' thinking and understanding of practical applications. Students can choose practical application cases through independent study and research before classes, and share and discuss with classmates in class, so as to deeply understand the process and method of practical application and improve their practical application ability. Fifth is the practical application of evaluation and feedback. Flipped classroom focuses on the evaluation and feedback on students' practical applications. After practical application in class, students can get the evaluation and feedback from teachers and classmates, understand the advantages and disadvantages of practical application, so as to adjust and improve the process and results of practical application, and improve the practical application ability [5].

2.4 Improve the problem-solving and innovation ability

First, solve problems independently. Flipped classroom can cultivate students' ability to solve problems independently by providing learning resources and guiding students to study independently. Students can master theoretical knowledge through independent learning before class, and then solve problems independently through discussion and practice in class, so as to improve their problem-solving ability. Second, cultivate innovative thinking. Flipped classroom can guide students to conduct innovative thinking and activities to cultivate students' innovative ability. Students can carry out creative design, development projects, practical application and other activities in class, and cultivate their innovative thinking and innovative ability by solving practical problems and applying knowledge. Third are actual projects and case analysis. Flipped classroom can provide practical projects and case analysis, so that students can master theoretical knowledge through independent learning before class, and then carry out practical projects and case analysis in the class, so as to cultivate students' practical problem solving and innovation ability. Fourth, cooperation and team work. Flipped classroom can develop students' teamwork and problem solving skills by encouraging students to cooperate and team work. Students can solve problems and innovate together in the classroom through cooperation and team work, thus improving their problem-solving and innovation skills.

Epilogue

In conclusion, the application of flipped classroom in computer teaching provides students with a more active, in-depth and autonomous learning experience, helping to improve students' learning participation, personalized and self-directed learning ability, emphasizing practice and application, as well as improving problem solving and innovation ability. However, flipped classroom also faces some difficulties in the application process, such as insufficient students' independent learning ability and inadequate resource preparation. Therefore, in practical application, teachers need to give full consideration to the students' learning needs and characteristics, reasonable design of flipped classroom teaching activities, provide sufficient resources and support, guide students to actively participate in and deep learning, so as to maximize the advantages of flipped classroom in computer teaching, improve the students' learning effect and practical application ability. In the future, with the continuous development of technology and the continuous innovation of educational mode, the application of flipped classroom in computer teaching will continue to receive attention and research, providing strong support for the promotion of students' comprehensive quality education and the cultivation of lifelong learning ability.

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