

# The Application of Flipped Classroom Based on Wechat in Practical Course\*

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**Abstract**—Due to the strong practicality of computer on-line courses, it is necessary for teachers to change traditional teaching methods and actively guide students to choose teaching contents according to their own needs for self-learning. Based on Humanistic and Constructivist learning theories, this paper selects the second teaching experiment — Local Area Networks (LAN) of the Computer Network and Application textbook to explore how teachers can use WeChat as platform for Flipped Classroom. It aims to reconstruct the traditional teaching design of computer on-line courses so as to achieve the better teaching effectiveness in Flipped Classroom. It is found that Flipped Classroom can make computer on-line courses more interesting, help students keep up with the latest development of computer technology and related network knowledge, and improve their learning initiative and innovative ability.

**Keywords**—*Flipped Classroom; WeChat; teaching design; humanism; constructivism*

## I. INTRODUCTION

With the progress of information technology and the change of teaching idea, Flipped Classroom has become a new popular teaching mode. In the traditional classroom teaching, the teacher first teaches the contents of the class, then the students finish their homework, give feedback, and finally the teacher answers students' questions. Flipped Classroom is also known as Inverted Classroom [1]. It reverses the relationship between classroom activities and after-school assignments in traditional teaching, or "flipping" it. In this model, teachers first give students access to relevant materials, and let students interact with each other before class, then discuss new information during class time and put those new ideas into practice [2]. Flipped Classroom first appeared in the teaching practice of American higher

education and primary and secondary schools. In 1997, Eric Matsu, a professor at Harvard University, developed a teaching strategy called peer teaching, which plays an important role in the development of the concept of Flipped Classroom. In 1998, Barbara Walward and Virginia Anderson, in their book called "effective score", proposed that students should be exposed to learning materials before class and focus their studies in class on synthesis, analysis, problem solving and so on [3]. In 2000, Maureen Lag, Green Platt and Michael Terrias introduced the flip teaching model they used when teaching "introduction to Economics" at the University of Miami in the United States, as well as their achievements. In 2004 and 2007, Bangladeshi-American Salman Khan, a high school chemistry teacher in Colorado, Jonathan Bergman and Aaron Sam, tried to share online teaching videos one after another. With the development and popularization of the Internet, the method of Flipped Classroom is becoming more and more popular in the United States. And this kind of teaching mode has been popularized in American primary and secondary education. Flipped Classroom encourages students to watch online lectures, online discussions, and do research at home under the guidance of teachers [4]. In group learning, students take the initiative in division of labor and actively participate in group study and discussion. In autonomous inquiry learning, they make full use of modern information and technology tools, actively seek new solutions to problems. On the basis of the original cognition, they construct new knowledge through self-internalization forwardly [5] [6] [7] [8]. The Flipped Classroom increases the interaction between teachers and students. Compared with the traditional teaching mode, the Flipped Classroom breaks the limitation of time and space. Students can make use of the fragmented time after class, according to their existing foundation and needs, study on their own at anytime and anywhere, arrange the learning schedule reasonably, and choose learning content freely. Teachers can answer questions on-line, know the students' learning progress in real time, and make adjustments on the teaching content and teaching progress in

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time according to the feedback. As to the problems that students encounter in the process of learning, the teacher can make up the deficiencies in a targeted manner [9]. In order to improve the students' learning efficiency and stimulate their interest in learning, the author will use the public platform of WeChat as a tool to design the teaching of the computer network course, carry on the Flipped Classroom teaching and reconstruct the teaching environment.

## II. THE THEORETICAL BASIS OF FLIPPED CLASSROOM TEACHING

Flipped Classroom is a teaching method guided by humanism and constructivism. The Flipped Classroom breaks the traditional teaching method, changes students' learning style and teacher's teaching method, enhances the interaction and communication between teachers and students, and improve the students' interest in learning and their ability of independent thinking and teamwork, which fully reflects the concept of "people-oriented" education. On the basis of students' independent inquiry learning and collective cooperative learning, it changes teachers' traditional teaching mode, students' original learning style and knowledge acquisition method, reconstructs the cognitive structure and enables all students to study on their own initiative [10]. According to Rogers, a representative figure of humanistic psychology, human beings are born with learning aspirations and potentials, which can be released under certain circumstances. When the learning content is consistent with their own needs, students' enthusiasm for learning is most easily motivated. Rogers believes that the task of teachers is not to teach students knowledge, but to provide them with the means of learning, and to teach them how to learn [11]. Students need to choose learning methods and learning content according to their own needs and actual situation. The teacher should only be the organizer, the guide and the promoter of the student's study. The humanistic learning theory, which emphasizes the student-centered construction of learning situations, explains the whole growth process of learners from the perspective of human education, and makes use of the learners' existing experience to inspire the potentiality and creativity of learners. It is based on the development of human nature, so that learners believe in themselves first, and then achieve self-realization. Humanism advocates understanding people's psychology from their direct experience and internal feelings, emphasizing human nature, freedom, ideals and interests. Its learning theory focuses on how to construct a good learning environment for learners. Let them perceive the outside world from the point of view of self, improve their cognition and understanding of the outside world, and finally reach the highest level of self-realization.

Constructivism advocates that learning is not the process of teacher simply passing knowledge to students, but the process of students actively constructing knowledge on the basis of the original experience, psychological structure and belief [12] [13]. The learning process should include two aspects at the same time: on the one hand, the construction of the meaning of new information, on the other hand, the reconstruction and reorganization of the original experience.

The acquisition of learning meaning is a process in which each learner encodes new information and constructs his own understanding on the basis of his original knowledge and experience. In this process, the original knowledge experience is adjusted and changed because of the entry of new knowledge experience. Therefore, constructionists pay attention to how to construct knowledge based on the original experience, psychological structure and belief [14] [15]. In the teaching process, the learning content should choose the authenticity task with the concrete premise, and the teacher is asked not to teach the prepared content to the student. Instead, they should show an exploration process similar to that of real-world expert problem-solving (some people even argue that teachers should not prepare lessons), provides prototypes of problem-solving, and instructs students to explore [16]. Because knowledge is a network structure around key concepts, constructivism believes that it is necessary to present relevant overall tasks and provide tools to better understand and solve problems in the design of the teaching process, allowing students to try to decompose and solve problems one by one. Then let them learn independently or in groups to explore and cooperate, to discover the basic knowledge and skills needed to solve the problem, and on the basis of these knowledge and skills, the problem was finally resolved [17].

## III. INSTRUCTIONAL DESIGN

This chapter is based on humanistic learning theory and constructivism learning theory, takes WeChat as an information tool, selects the LAN construction, which is the second teaching experiment of "computer Network and Application", so as to analyze and design the teaching objectives, teaching contents, students' situation and teaching strategies.

### A. Teaching Target Analysis

The academic goal of this experiment is that students can be familiar with building peer-to-peer networks through cross lines, using switches and parallel lines to build local area networks (LAN), solving the problem that how computers with different operating systems access each other under LAN. The purpose of the process and method of this experiment is to enable students to "learn from doing" and "improve from use" through the task-driven teaching method, so that students can experience the joys of cooperation and communication in the concrete process, and learn the right and practical collaborative way. The emotional purpose of this experiment is to make students cultivate a sense of achievement in the process of autonomous exploration and solving practical problems, lay a good foundation for their motivated learning in the future, and further establish their self-confidence in the study of information technology. Through group cooperation and thematic research activities, the students' awareness of collaborative learning and the spirit of research and exploration can be cultivated, so as to their interest in the network.

**B. Teaching Content Analysis**

Through analyzing the whole knowledge system structure of this chapter, we can make clear the important and difficult points of teaching, and grasp them better. The experiment can be divided into three parts: building peer-to-peer network by crossing lines, constructing local area network by parallel lines, and let computers with different operating systems access each other under LAN. The teaching emphasis is: the method and steps of building peer-to-peer network by crossing line and the method and step of constructing parallel line by parallel line. The difficulty in teaching is that let computers with different operating systems can access each other under LAN.

**C. Teaching Object Analysis**

Students are the main body of teaching activities. Full understanding of students is a necessary condition to achieve good teaching results. Through the study of the previous chapters, the students' information literacy has been greatly improved, and the operation skills of using computer network technology to solve practical problems have made great progress. In particular, most of the students have a solid practical ability in the production of twisted pair, which is helpful to understand and build LAN skillfully. By observing how students make use of computers and communicating with them after class, we can see the present situation of the students is: before the class study, they have mastered the basic knowledge of the network, such as the types and functions of the network, the hardware (workstation, server, protocol and communication connection devices) and network topology, IP, subnet mask and gateway settings and laid the foundation for the study of this section. Most of the students have preliminary group cooperation and inquiry ability. But the computer practice operation ability in them is polarized seriously.

**D. Teaching Strategy Design**

Through the analysis of teaching objectives, teaching contents and teaching objects, the design ideas of teaching, teaching activities and the choice of teaching media should be established.

1) *Teaching method design:* According to the characteristics of students' existing foundation and teaching contents, this paper adopts constructivism learning theory, and advocates teachers to carry out the Flipped Classroom teaching in the network classroom. Teachers use multimedia teaching means to create situations and task-based teaching methods to guide students to adopt self-inquiry and group cooperation learning methods.

2) *Designing idea about teaching activities:* On the WeChat platform, teachers upload multimedia video, audio materials, courseware, documents and related network links. Under the guidance of teachers, students carry out autonomous learning and group cooperation to complete the experiment.

3) *The choice of teaching media:* Teachers will choose the network room (LAN), Internet, WeChat, textbooks, multi-media courseware, audio and video materials as the teaching media of this course. Teachers can use media devices to demonstrate pre-made LAN cases to students, present the methods and steps of building peer-to-peer networks and local area networks directly, and set problems in courseware. Let students solve problems through in-depth thinking to obtain a deeper grasp of knowledge.

**E. The Design Process of Classroom Teaching Process Structure**

The design process of classroom teaching process structure is shown in "Fig. 1".

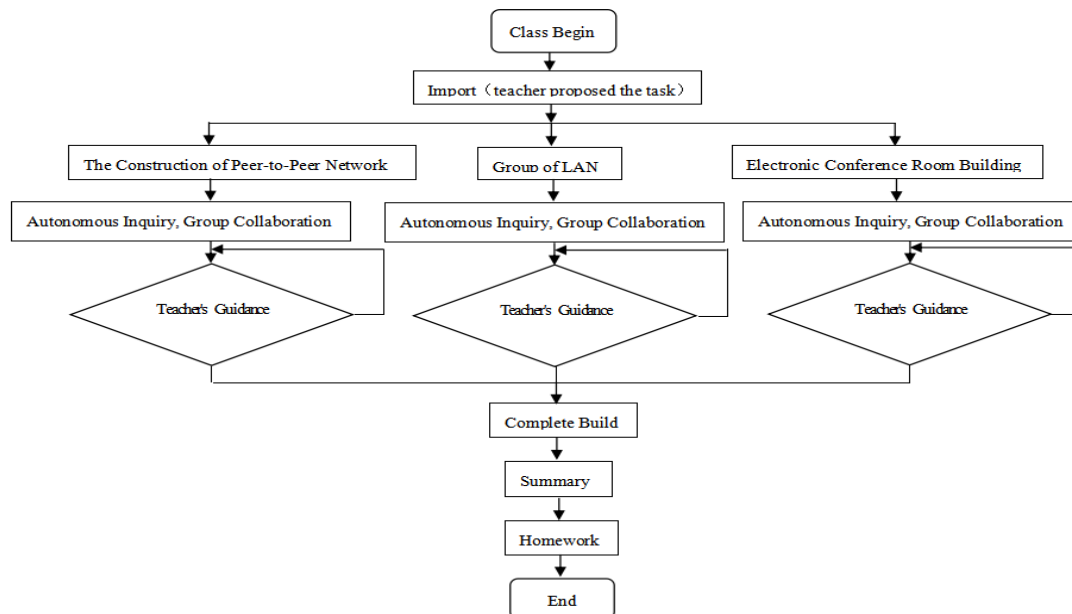


Fig. 1. The design process of classroom teaching process structure.

#### IV. FLIPPED CLASSROOM BASED ON WECHAT APPLICATION IN COURSE

##### A. Pre-class Design Module

Under the guidance of humanistic learning theory, according to the needs of every link of the Flipped Classroom teaching model and the interactive function of WeChat, the environmental context of Flipped Classroom teaching mode based on WeChat is constructed, which puts an emphasis on teachers as the leading factor and students as the center. This is a teaching environment that can give full play to students' learning autonomy and group cooperation, and mobilize the exchange and interaction between teachers, students and learning resources in the teaching process. It can meet the requirements of heuristic exploration, independent thinking, group cooperation, information acquisition, information processing, resources sharing and so on. Teachers need to analyze the teaching objectives and teaching contents before class and make full understand to the students' existing knowledge structure, learning methods, psychological activities. And they should push the relevant curriculum materials such as the teaching-related network links, text/video to the WeChat platform, so that students can learn independently or in groups before class.

Teachers should take into account the characteristics of the teaching content, the visual effect and the length of time that students are easy to accept when making micro-class videos, and create a rich library of resources. After the students understand the new knowledge points, they can practice through the test questions, submit the self-test results online, and feedback to the teacher in time. The teacher summarizes the students' feedback before class, and then sums up and combs the different problems encountered by the students, so as to make full preparation for the classroom teaching. Teachers can also use WeChat Mini Program to set up interesting games and bind the games to relevant learning materials, so that students can obtain learning resources through simple game interaction, which not only improves the entertainment of students in the process of autonomous learning, but also enhances the initiative of learning. In the learning mode based on WeChat, the open teaching can be realized by Flipped Classroom teaching mode. According to the students of different foundations and characteristics, through big data's analysis, the learning contents of different forms can be automatically pushed to realize the sharing of teaching resources.

##### B. Teaching Module

Teachers mainly play the role of organizers and leaders in the classroom. They should make full use of the elements of cooperation, situation, and conversation and so on when designing classroom modules. In the classroom, teachers should organize students to discuss the problems that they meet in self-study, create situations, provide resources and methods, so that students can play their main role in self-study, solve their own problems, build knowledge structure and complete its internalization of the knowledge learned through self-regulated learning/group collaboration learning.

And the following aspects should be paid attention to in classroom teaching:

Firstly, according to the students' pre-class learning feedback, teachers select and summarize the problems that should be discussed and solved in the classroom. And the students should group themselves, determine their members, select a question and split it according to the actual characteristics of the question, then divide the labor, and cooperate to explore the problem. In the process of students' learning, teachers guide students to make learning plans and use learning tools to help students to carry out group cooperative learning.

Secondly, in the teaching module of Flipped Classroom, teachers will focus on guiding and cultivating students' ability to learn actively and solve problems independently. The teacher will fully respect the personality of the students, and let the students feel things, observe, analyze, think about problems and actively construct their own knowledge system in the process of learning.

Thirdly, through the discussion, communication and mutual learning from both inside and outside the class, students can improve their thinking ability. At the same time, they can strengthen their communication ability, tolerance ability and team cooperation ability, and enhance the collectivism honor.

Finally, results should be exchanged. Students report and communicate the learning results of individual or group in class, and send the final results to WeChat, which not only facilitates the follow-up review and retrospect thinking, but also sums up and summarizes the knowledge points.

Through the pre-class and classroom design, by using the Flipped Classroom teaching mode based on WeChat, students can make use of the usual shard time to study the pre-class knowledge point at anytime and anywhere. Then they can internalize the knowledge in the classroom. And teachers can also instruct and answer questions in real time.

#### V. CONCLUSION

Based on the Flipped Classroom teaching mode of WeChat, the teaching environment is reconstructed, the teaching design is carried out again, the students' interest in study is improved, the students' creative thinking is developed, and the students' ability to think and solve problems independently is enhanced. Students become the master of the class. Through setting up teaching environment on WeChat platform and re-designing teaching strategy, knowledge can be decomposed into micro-class video, which can reduce students' learning difficulty, facilitate students to grasp and digest new knowledge. So the students can understand the basic knowledge before class, to discuss problems in class, ultimately improve learning efficiency.

Based on the teaching design of flipping classroom, the guiding ideology of "everything from student subject" is adopted, so that students can become "explorers" of knowledge and skills, "breakers" and "solvers" of difficult problems, and the truly masters of learning. It has been

proved in practice that the classroom after redesigning is vivid and the teaching results are remarkable, which has changed the situation where only teachers' teaching "fills the classroom" in the past, and has cultivated the students' creative thinking and improved their ability to solve problems.

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