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ARTICLE

# The Teaching Mode Research of "Internet Plus Flipped Class"——Taking the Course of *Satellite Meteorology* as Example

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ABSTRACT

Based on the existing disadvantages of traditional teaching mode of *Satellite Meteorology* course in Chengdu University of Information Technology and the new teaching mode overview of "Internet Plus flipped class", this paper is mainly to construct flipped class teaching mode of *Satellite Meteorology* under the background of "Internet Plus" in Chengdu University of Information Technology. Through the Internet, it also tries to integrate this teaching mode into flipped class before class, in class, after class, which means to provide a new thought for the teaching of this course in colleges and universities.

## 1. Introduction

According to the 44th China's statistical report on the Internet development in 2019, up to June, 2019, the number of netizens in China had reached 854 million with an increase of 25.98 million and the Internet penetration rate had reached 61.2 percent with an increase of 1.6 percent from the end of 2018; The number of mobile netizens had reached 847 million, increasing by 29.84 million and the proportion of netizens through mobile phones had reached 99.1%, up 0.5 percentage from the end of 2018. In the netizen age structure, netizens from 10 to 39 years old account for 65.1 percent of the total netizens, among which netizens from 20 to 29 years old account for 24.6 percent, while students account for 26.0 percent. It shows that the Internet has been an important method for contemporary youth to know outward things and accept development information in the Times. According to the *Report on the Work of the Government* in 2019, it certainly proposed to develop "Internet Plus Education", so as to enhance high quality resources sharing. At present, the number of online education users in China reaches 232 million, growing by 31.22 million from the end of 2018, which accounts

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for 27.2% of the total number of netizens. With the development of online education, "Internet Plus Flipped class" teaching mode based on the Internet is the demand of contemporary education and the trend of the Times for university students.

## 2. The New Teaching Mode Overview of "Internet Plus Flipped Class"

According to the demands of the *Outline of National Medium-and Long-term Plan for Education Reform and Development* (2010-2020) as well as *Ten-year Development Plan for Educational Informatization* (2011-2020), universal education, quality education, mixed learning, mobile learning, personalized learning and lifelong learning have become important characteristics and inevitable results of education development in the new era. Flipped class originated from the United States. The earliest practitioner was Salman Khan of America who unwittingly made a teaching revolution around the world by setting up the website of Khan Academy in 2007. As the year 2015 was the first year of "Internet Plus" in China, the new normal had appeared in university education. Its appearance made us have to re-inspect and reform the current education mode, so as to respond new problems in the educational teaching.

The new trend of flipped class teaching mode provides a new thought for solving these problems in a targeted way, which changes the teaching mode of traditional classes and conforms to new demands of "Internet Plus Education" toward online education with new changes and reform of traditional education. Under the "Internet Plus Education" background, teachers are deeply aware of the importance of classes' changes and reform, feeling that class teaching method can largely reflect the way of cultivating talents [1]. In some way, the Internet hastens "Flipped Class" teaching mode, which makes flipped class become necessary trend of class teaching reform in the era of "Internet Plus". As a kind of teaching design method, flipped class has been a hot-spot topic of researches and practices for academicians and teaching staff at home and abroad. Its positive effects on classes and teaching achievements have been consistently recognized by academicians and educational staff [2]. On the basis of Internet teaching thought and Internet information techniques, "Internet Plus Flipped Class" mainly through video teaching and online teaching. The second is through teaching procedures and methods, which has essential differences from traditional teaching mode in the way of teacher and student roles as well as obvious mixed learning features.

## 3. The Construction of Flipped Class Teaching Mode on Satellite Meteorology under the Background of "Internet Plus"

Since the successful launch of the first meteorological satellite in 1960s, satellite detection technology with rapid development has set up global satellite observation system, which has largely enriched the contents and scope of meteorological observation, greatly promoting the development of atmospheric sciences. The appearance of meteorological satellite has played a crucial role in many aspects, including detection theory and technology, hazard weather monitoring, weather analysis and forecasting, so as to improve the formation of a new branch of satellite meteorology [3]. *Satellite Meteorology* is a core compulsory course for undergraduates, majoring in atmospheric science and applied meteorology in Atmospheric Science College, Chengdu University of Information Technology. The course is divided into three courses and seven executive semesters, including thirty-six teaching hours and twelve experimental hours. Focusing on basic definition, principle, method and materials application of satellite meteorological observation, this course which reflects current developments on satellite meteorology is one of the professional and technical knowledge that students have to be engaged in the rapid development of meteorological career after graduation.

At present, this course mainly adopts traditional teaching mode with single teaching form and approach, which cannot arouse students' great interest. Besides, it has some drawbacks, such as scanty teaching contents, single teaching activities, results-centered teaching evaluation, weak awareness of students' independent learning and difficulty in reflecting teaching results, which make it urgent to reform in line with the development direction of the innovative teaching mode. Based on the existing concepts, theoretical framework, teaching mode and practice of flipped class at home and abroad, the differences in teaching form between traditional class and flipped class as well as flipped class teaching mode of Internet teaching platform, this paper takes *Satellite Meteorology* course of applied meteorology major in Atmospheric Science College, Chengdu University of Information Technology as example, making construction around flipped class teaching mode under the "Internet Plus" background. Through practices and researches on one experimental class, the authors make comprehensive comparison and analysis of teaching results towards ordinary class with traditional teaching mode in order



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to explore flipped class teaching mode which is suitable for this course. In the way of creating efficient class, promoting teaching quality, teachers and students can make progress together. The teaching mode construction mainly consists of three parts, including preparation before class, practices in class and review after class (Figure 1) [4].

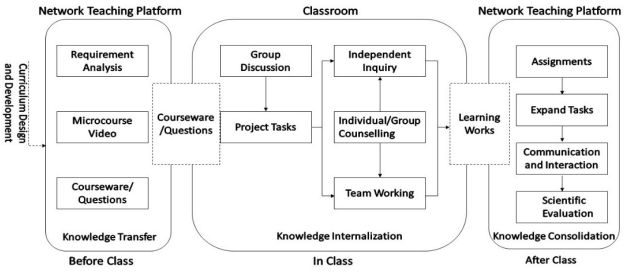


**Figure 1.** Teaching Mode Construction of Satellite Meteorology Based on "Internet Plus Flipped Class"

### 3.1 Preparation before Class, Micro Lessons Record and Resources Sharing

In order to master students' interests, learning habits and learning effects before class, firstly, online and offline communication analysis should be made between teachers and students, so as to choose key and difficult points and questions in the learning contents as materials for making teaching videos according to syllabus and programming; Secondly, through making microcourse video system, some questions worth exploring should be designed to arouse students' learning interests and to guide them actively to think; Finally, through clear learning tasks, microcourse videos, questions and learning resources should be uploaded to online teaching platform, so students can study according to their own time and make online or offline exchanges anytime [5].

Regarding analysis of satellite images in this course as example, firstly, according to knowledge points to make: ① Basic features of visible light cloud image; ② Basic features of long-wave and short-wave infrared cloud images; ③ Basic characteristics of water vapor map; ④ Six criteria for cloud identification on satellite cloud map; ⑤ The identification of various clouds on the satellite cloud map; ⑥ Analysis of six videos on the surface features of satellite cloud map. Secondly, it need to design: ① How to distinguish different channels of satellite cloud map? ② How to distinguish the ground from the clouds, especially the clouds and snow? ③ How to identify the low, middle and high clouds on the satellite cloud map according to the six criteria for cloud identification? These questions can guide students to make deeper thought. Students can learn knowledge points and solve problems by repeatedly watching videos or looking up relevant materials. At the same time, teachers need to record all kinds of questions that student's feedback in learning and summarize hot-spot questions for specific explanation in class.

### 3.2 Practice in Class, Teacher Answering Questions, Group Cooperation

Flipped class requires teachers to hand over time to students in class. Therefore, teachers mainly answer questions and explain difficult problems feed back by students during the preparation before class. At the same time, based on the good interaction between teachers and students, teachers can adopt the project task-driven teaching method, making students finish each project task module arranged by teachers in class with team cooperation and independent exploration. As for questions encountered by individual students, the whole class can make broad and in-depth discussion, research and put forward solutions. After the completion of the project tasks, teachers can organize students to make presentation, communication and evaluation.

Still taking "Analysis basis of satellite images" in the course of Satellite Meteorology as an example, the whole class teaching process is divided into four stages: "problem solving, project task explanation, student practice, exchanges and evaluation".

First of all, teachers make targeted interpretation at all types of questions feed back from the preparation before class and make knowledge extraction, classification and summarization, which can deepen students' understanding and make them master all kinds of knowledge. It should focus on the basic characteristics of visible light cloud image, long-wave and short-wave infrared and water vapor cloud image, as well as six criteria and recognition of all kinds of cloud on the satellite cloud image, etc.

Then, during the learning process in class, teachers can arrange project tasks to make students practice as a team on a simulated business operating platform. For example, by designing the "Cloud Identification" form with the satellite cloud image of June 3-5, 2009 provided by teacher, students under the MICAPS (Meteorological Information Comprehensive Analysis and Process System) make use of four split screen to respectively open long-wave infrared, water vapor, short-wave infrared and visible light cloud image. And also by searching for targeted cloud system, students need to make analysis on this cloud system of a satellite image of four channels and on corresponding weather systems and weather


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phenomena in accordance with six criteria of cloud recognition on satellite cloud image. According to this project tasks, students carry out synchronous computer practice, which can deepen consolidation and mastery of theoretical knowledge in the way of combining theory and practice. Meanwhile, through students' independent thinking and mutual discussion, teachers' auxiliary guidance, students' knowledge system can be cultivated to make class atmosphere more active and vivid.

In the end, teachers arrange group task demonstration and exchange evaluation of project achievement, which can better expand students' thinking, learning contents and vision.

### 3.3 Consolidation after Class, Homework Assignment, Scientific Evaluation

After-class consolidation is an effective extension of class learning. Through online teaching platform or communication tools, teachers can publish announcements, assign homework and provide extensive knowledge resources on the Internet for students to better consolidate knowledge. Students make mutual exchanges and discussion by real time communication tool on the Internet, while teachers make further real time communication towards students' questions and provide guidance and reply in time. Through this kind of exchanges and interaction online, students' questions can be tackled in time and their knowledge can be further consolidated and deepened.

At the same time, in the way of after-class knowledge extension, students can explicit that basic features of each channel cloud image are the basis of this course and how to apply satellite meteorology knowledge to weather analysis and forecasting. It can also arouse students' interests in this course, explicit their awareness that this course can serve daily life, so as to mobilize their learning enthusiasm [6]. Finally, in order to ensure teaching effects, it is necessary to carry out effective scientific evaluation on students' performance in this class, so as to encourage them to study hard. What's more, a comprehensive evaluation system with multi-subject and diverse can be constructed through students' objective self-evaluation, students' mutual evaluation and teachers' comments.

## 4. Conclusion

The new teaching mode "Internet Plus Flipped Class" can improve students' study efficiency and make full use of their fragmented time, which can make their self-study and innovative ability to a new level. By making Internet information technology integrate into all parts before class, in class and after class in this course, it is helpful to arouse students' learning interests, transfer their study enthusiasm from passiveness to initiative. In this way, it can make the Internet better serve teaching, improving class teaching quality, which can truly foster more theoretical and applied talents meeting the needs of the times.

## References

[1] ZHOU YM. Reflection and Reconstruction of Classroom Change under the Background of "Internet Plus Education" [J]. Ningxia Education, 2020(03): 29-30.

[2] BERGMANN J. Solving the Homework Problem by Filling the Learning[M]. Beijing. China Youth Publishing Group, 2018:1-75.

[3] CHEN WM. Satellite Meteorology (3rd Edition) [M]. Beijing. China Meteorological Press, 2017:1-567.

[4] LIU KB. Design of Flip Classroom Teaching Mode Under "Internet Plus" [J]. Journal of Huanggang Polytechnic, 2017, 19(1): 45-48.

[5] QIU LQ, CHEN ZY, DING CQ. The Reform of Program Design Curriculum Based on Flipping Classroom Teaching Mode under the Background of "Internet Plus" [J]. Software Guide, 2016, 15(12): 185-188.

[6] WANG L. Construction of Analytical Chemistry Teaching Model Based on Flipping Classroom under the Background of "Internet Plus" [J]. Journal of Changchun Education Institute, 2019, 35(8): 27-28.



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