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Smart Teaching Reform and Practice of Flipped Classroom in Culture Geography Course Based on Chaoxing Learning Platform

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Abstract

The smart teaching model of flipped classroom based on cloud learning platform is the trend of college classroom teaching reform. By means of the Chaoxing Learning Platform and the teaching practice of cultural geography, this paper constructs a peer instruction relied on the flipped classroom. The three stages that teachers and students need to complete, namely, before class, during class and after class can be utilized to evaluate the teaching effect of flipped classroom. Before class, students preview through micro-class resources material on Chaoxing Learning Platform provided by teachers, communicate with classmates and teachers in real time, discuss and cooperate with each other during class through cultural theme project-based learning and peer instructions, and think profoundly and self-examination after class. The analysis of students' learning effect indicates that such a teaching mode promotes students' subjective initiative in learning, improves the performance and comprehensive capabilities of students. As a new and efficient teaching method, "Chaoxing Learning Platform + Flipped Classroom" plays an important role in enhancing teaching quality and promoting the development of students' comprehensive quality, such as self-directed learning, communication and cooperation.

Keywords: smart teaching, flipped classroom, cultural geography, Chaoxing Learning Platform

1. Research Background

In recent years, emerging information technologies such as artificial intelligence and big data have been widely used in the field of education. It has become an inevitable trend in the information age to lead the innovative development of educational informatization with smart education, so as to drive the innovative development of education and teaching (Zhu, 2016). Ten-year development plan for education informatization (2011–2020) formulated by the Ministry of Education in 2012 clearly pointed out that the comprehensive and deep integration of modern information technology and education should be explored, and the innovation of education concepts and education models should be guided by informatization (Ministry of Education, 2012). In 2018, Ministry of Education of the People's Republic of China issued the Education Informatization 2.0 Action Plan, which clearly establishes a smart learning environment. We will carry out innovative demonstrations of smart education. In 2019, China's Education Modernization 2035 plan was launched to propose a new concept of in-depth integration of information technology and education and teaching for innovative development. The overall plan for deepening education evaluation reform in the New Era issued by the Central Committee of Communist Party of China and The State Council in 2020 stresses the role of information technology in reforming student evaluation. This action plan of education reform and development based on top-level design and top-down will face the key constraints of smart teaching such as the update of educational concept, the improvement of information literacy and information teaching ability, and the innovation of teaching mode in the implementation of educational practice and classroom. Smart teaching will advocate and pursue the new concepts of learning-centered, ability-first, teaching innovation and personalized learning.

The classroom is the main position to implement morality and cultivate people and cultivate core qualities, and it is also an important benchmark to determine the quality of a school's education. Under the background of the rapid development of Internet^{+} education, the efficient classroom to complete the teaching tasks and achieve the teaching goals can't be separated from the deep participation of various smart technologies.

Flipped Classroom is also known as the reversed classroom or inverted classroom. It means that in the

information environment, teachers provide pre-recorded teaching videos for students instead of traditional classroom knowledge teaching, and students watch and learn independently before class. It is a new teaching mode for students to internalize knowledge that teachers and students' complete homework answering, collaborative inquiry and interactive communication together in class (Qi, 2015). The essence of flipped classroom refers to that educators give students more freedom, put the process of knowledge delivery outside the classroom, and let students choose the most suitable way to receive new knowledge. A learning model in which the process of internalizing knowledge is placed in the classroom so that there is more communication and exchange between students and between students and teachers. As a means of implementing differentiated teaching and personalized teaching, this model guides students to study independently and cooperate in exploration, and reconstructs the educational concept and teaching thinking (Zhang, 2017).

Chaoxing Learning Platform is a mobile terminal learning platform that integrates course learning, knowledge dissemination and management sharing. The platform includes modules such as information, notice, homework, examination, discussion, activities and statistics, as well as interactive functions such as class signature scramble answer and grading, which provides the basis and conditions for the practice of flipped classroom. Some universities have tried to introduce learning pass into undergraduate teaching, and achieved good results (Zhang, 2019).

Cultural geography interprets the origin, formation, development, dissemination and integration of culture, including religion, language and nationality, from the perspective of geography, and specifically points out the role of Geography in culture. From a new perspective, we will realize that cultural development is not only influenced by human factors, but also by a large number of other natural factors, such as geography. The Cultural Geography class will explore the charm of Yu Feng and Chu rhythm, the distinctive food culture of different parts of China, the beauty of the regional characteristics of traditional residential architecture and culture, the beauty of listening to vernacular sounds, the hidden environmental and historical cultural imprints behind place names, the interaction between religious beliefs and the environment, and the mystery of research themes such as cultural ecology, cultural diffusion, cultural integration, cultural districts and cultural landscapes.

Under the condition of many knowledge points, few teaching hours and heavy tasks in cultural geography course, the traditional infusing teaching method can no longer adapt to the new teaching situation. Therefore, in order to improve the effect of talent training, it is necessary to update the existing teaching mode and concept. In this study, we apply the flipped classroom model based on the learning connect platform and integrate micro-lessons and case study teaching methods to provide students with personalized guidance in the process of independent online learning and classroom teaching, focus on the construction of learning activities and learning contexts, and add teaching feedback modules to prompt students to better internalize their knowledge in order to provide new ideas for the teaching reform of cultural geography courses.

2. Design of Flipped Classroom Teaching Model for Cultural Geography

2.1 Theoretical Framework of Teaching Model Design

Educational research shows that traditional lecture-based teaching methods can only achieve low-level educational goals, namely, memory, understanding and application, but have little effect on cultivating students' higher-level educational goals, such as analysis, evaluation and creation. Ruggiero believes that the teaching of high-level reasoning and critical thinking depends not on the content but on the method of teaching. "Teaching method reform is the only way to solve the problem, and cooperative learning is an effective method." Through cooperative learning, it is more likely to achieve the three higher-order thinking goals of analysis, evaluation and creation in Bloom's classification of educational goals (Ruggiero, 1988). In cognitive theory, learning is divided into four basic types: Accumulation learning, Assimilation learning, Accommodation learning and Transformation learning (Bransford, 2000). Accumulation is the addition of new information, and memorization is its main feature. When analogy and imitation are used in learning to link new knowledge to old knowledge and merge it into an existing schema, it is called assimilation. Conformist learning is the process of reconstructing parts or the whole of an existing mental schema; transformative learning is the simultaneous reorganization of a large number of mental schemas and requires the learner to be reflective in order to generate new beliefs and creative ideas (Zhang, 2021). Adaptation and transformation learning is to achieve high-level learning goals, achieve gender once, and cultivate students' innovative ability, which is of great significance and application value.

Based on the above research results of cognitive theory, constructivist learning theory, metacognitive theory and other educational theories, combined with the practical experience of early teaching reform, the Flipped Classroom based Peer Instruction (abbreviated as FCBPI) is designed and constructed, and its structural model

framework is shown in Figure 1. In the FCBPI teaching model, we have designed a variety of learning tasks and learning environments that cover four types of learning: cumulative, assimilation, compliance and transformation, reflecting the three higher order thinking goals of Bloom's cognitive education classification of analysis, evaluation and creativity (Bloom, 1956).

FCBPI teaching model divides the learning process into three stages: self-study before class, discussion in class and inquiry after class.

(1) The easiest part of teaching task, namely knowledge transfer, should be moved to the beginning of class so that students can learn independently. Students develop an initial understanding of physical concepts and principles through self-study and complete a basic construction of the course content through individual efforts to pre-process it. Students should not attend class discussions empty-handed. Self-study before class is the basic link to participate in class discussions effectively.

(2) Using Peer Instruction (PI) in the classroom (Zhang, 2010). Make full use of face-to-face opportunities for active social interaction and cooperative group learning between teachers and students and between students and pupils, embedding group discussions in traditional classroom teaching and using technical support to achieve teacher-student and student-student interaction. Instead of explaining everything from beginning to end, teachers start with the level of understanding reached by students after independent learning and group discussions, and only cover key points and difficulties to help students gain a deeper understanding and refine their knowledge structure.

(3) Carrying out Project Based Learning (PBL). Based on complex questions raised by students during in-class discussions or challenging questions specifically designed by the teacher for students to explore collaboratively at the end of class. The more difficult and complex the learning, the more this interpersonal relationship between students is needed to provide support. The knowledge required to solve such problems may exceed the course level, or interdisciplinary knowledge is required. Students can only solve them by consulting literature, designing experiments, programming simulation and other means after class. Completing such tasks can take several weeks, and the project results are submitted in the form of academic papers.

The teaching model of FCBPI strengthens students' autonomous learning and increases cooperative learning and inquiry learning, so as to build a student-centered teaching mode and realize the high-level, innovative and challenging "golden class" (Wu, 2018).

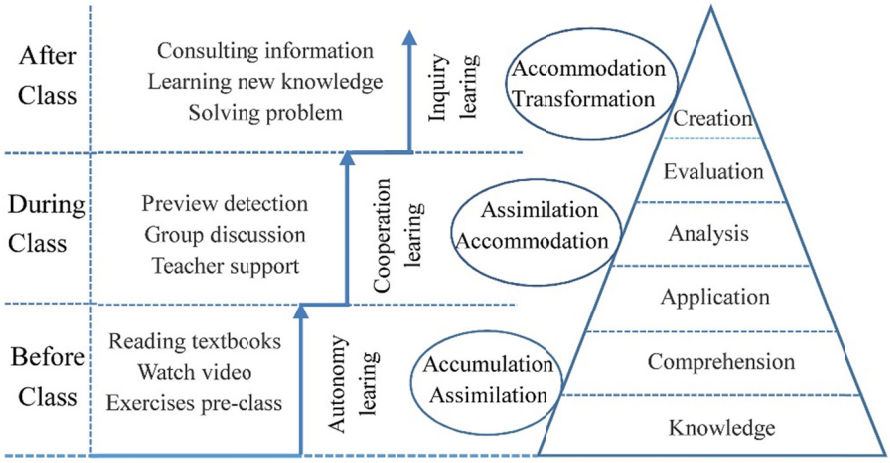

Figure 1. The Framework of FCBPI teaching model (the triangular part on the right side of the diagram is adapted by Bloom's classification of cognitive education goals)

2.2 Flipped Classroom Teaching Model Design

The design process of applying the flipped classroom teaching mode based on the learning link platform to the teaching process of cultural geography is shown in Figure 2.

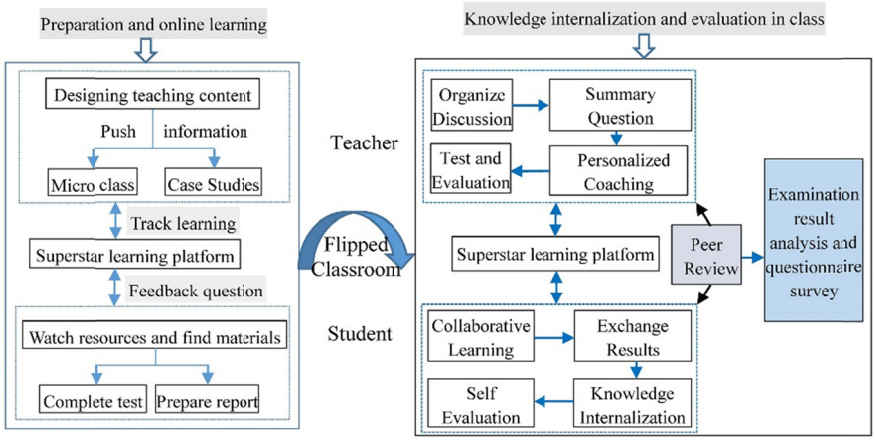

Figure 2. The process of flipped classroom teaching model based on Chaoxing Learning Platform

(1) Build a personalized learning environment

Firstly, an interactive personalized autonomous learning network environment of "learning link class group instant messaging" is constructed. Students can use the learning materials of the Learning platform to conduct personalized learning according to the requirements of the teaching syllabus. When encountering problems, students can discuss with teachers and classmates through class groups, or get personalized guidance directly from teachers. In this process, teachers provide support for the development of students' autonomous online learning.

(2) Provide relevant resources before class

The video we made micro videos of clothing culture geography, food culture geography, architectural culture geography, transportation culture geography, language culture geography and cultural area and pushed them to students before class. The duration of each micro-video is 5–15 minutes; the total time is short, which is convenient for students to use fragments of time to learn. At the same time, according to the learning content, design thinking questions, multiple-choice questions, judgment questions and other types of questions, so that students can better master knowledge points and achieve the established learning goals through tests.

A library of cultural themed cases. We adapted the complete cases with cultural themes and suitable for the case teaching method. Before class, students were asked to preview relevant content and search for materials so that students could discuss and report in class.

(3) Classroom teaching

Divide the students into groups of five for thinking and preparation; each group in the classroom discusses the cultural theme case, the problems encountered and the questions assigned to them in small groups, summarize the answers and conclusions, and then nominate a representative to report, share and evaluate the group. Finally, the teacher analyzes and summarizes the common problems and case discussion.

(4) Evaluation of teaching effectiveness

The evaluation of flipped classroom teaching effect integrates formative evaluation and summative evaluation. The learning process is recorded based on students' viewing of teaching resources, feedback on assignments and classroom performance; students are asked to make self-evaluations and peer evaluations of their own performance and learning outcomes; supervising faculty members participate in classroom listening sessions and give peer feedback evaluations; the questionnaire was used to test students' opinions and suggestions on the method and to further improve the teaching method.

3. Practice Process

A total of 56 students majoring in geography science of the Class of 2018 in Xinyang Normal University were selected. The flipped classroom teaching model was used as the experimental group, and the other 51 students of the major were selected as the control group using traditional lecturing teaching method. There was no significant difference in student source, sex ratio and final score of human physiology in the previous year between the two groups, and the teachers were the same. Before the formal implementation of flipped classroom teaching method, students in the experimental group have completed the study of relevant content in the

introduction of the course, and have a general understanding of the subject and master the basic concepts. At the same time, according to the before class survey results, students also have a relatively good understanding of the functions of the learning software, and the campus wireless network is fully covered, so they have the conditions to use the network for learning.

3.1 Design of Micro-Course Content

Self-directed learning before class—to acquire new knowledge. Develop learning strategies, reflect on and adjust the learning process, monitor learning progress, and self-evaluate. In the early stage, we recorded all the chapters (clothing culture geography, food culture geography, architecture culture geography, transportation culture geography) in accordance with the knowledge points, each knowledge point lasted 10 to 15 minutes, and several thinking questions were set according to the requirements of the teaching syllabus. Students were asked to watch the video with questions to deepen their understanding.

Cooperative learning in class—peer discussion. Stating personal views, listening to each other's views and questioning; providing evidence and reasoning processes to support their own views, examining each other's evidence and reasoning to gain more information; examining each other's evidence and reasoning, experiencing conflicting views, generating cognitive curiosity and asking new questions; incorporating each other's views, or refining their own evidence and reasoning, or changing positions. For example, in the Geography of Food and Culture section, we have designed questions such as "Hunger breeds discontent", "The Four Major Cuisines of China", "The Philosophical View of Chinese Food Culture" and "We Live in the Age of Chilli" to examine students' inductive, summarizing and dialectical thinking skills.At the same time, objective questions such as the evolution of food processing, regional differences in food flavor, food cooking and flavor culture and right and wrong are also set, and the classroom test is carried out by using the learning pass software. Based on the real-time status of the students in the classroom, the format of grab + bonus, random selection and group PK are used in order to liven up the classroom atmosphere and increase the interest of the students in the course.

After class inquiry learning—research and solve new problems. Thinking, designing, predicting and evaluating research objectives, processes and outcomes, thinking outside the box and innovating in practice. The test results are processed and analyzed after the lesson to test the students' mastery of the pre-lesson micro-lesson content and their weaknesses, so that the presentation of the relevant content can be further improved.

The results showed learning to learn and obtaining the ability of lifelong learning. Increased interest in learning, greater motivation for achievement and intrinsic motivation, and improved cooperative communication skills. Deep understanding, high level reasoning, critical thinking, active creativity. Develop creative skills—the ability to solve unknown problems.

3.2 Project Based Learning

According to the requirements of the teaching syllabus, we select the cultural area subject case topics that are closely related to the key content of teaching and moderate in difficulty, and push them to students through the "notification" function of the learning software before class. In class, the main teaching method is project-based learning group discussion.

Taking the study of the cultural area "Chinese Cultural Area" as an example, teachers first explain the key points (division of Chinese cultural areas) and difficult points (regional differences between northern and southern cultures, overview of main characteristics of Chinese cultural areas, etc.) through multimedia and video in classroom teaching. Then, students were guided to conduct group discussion on the "sub-district of Central Plains Culture in Eastern Agricultural Cultural District", which was recommended to most students before class. (Before class, students were randomly divided into several groups with 5 members in each group, and one person in each group was selected to report and make a speech. According to the project theme—the cultural geography of my hometown, the members of the group will take turns to report and speak, and each student will have at least one chance to report). When one group reports, the other groups will ask questions and discuss, and the members of the group will make necessary supplements. Finally, the other groups will score the report and the performance of the group discussion, and the students in the group will evaluate and score themselves.

The issues discussed in the cultural theme project mainly include: the geographical background of cultural regional differences, the principle and basis of cultural geographical regionalization, the regional distribution of 24 cultural sub-regions, the main ethnic groups and cultural characteristics, etc., combining these ideas to condense the cultural characteristics of hometown. In the process of discussion, teachers and students are in an equal relationship. Teachers encourage students more and criticize them less, so that students can bravely express themselves and argue reasonably. Teachers should pay attention to the rhythm of the discussion, guide

students to speak around the problem, and encourage students to participate actively. Finally, the teacher comments on the process and results of each group's case analysis and discussion, explains the thinking of the case analysis, analyzes the process of the case, summarizes the case, and responds to the teaching purpose. In the end, the teacher graded the reports of each group and included them in the usual grades. During the course of the lesson, the teaching supervisor or other teachers from the teaching department are invited to conduct peer evaluation. After class, each group of students further thought and reflected on the project of hometown cultural geography.

4. Evaluation of Teaching Effect

4.1 Teacher Evaluation

Other teachers and supervisors in the teaching and research group made a comprehensive evaluation of the students through the classroom listening activities, including the comprehensive evaluation of the students' data collection, the content of the speech, and the enthusiasm of participating in the activities. The teachers in the teaching and research group agreed that most of the students were well prepared before class and could find suitable literature materials by combining the cases of cultural areas and related problems. The classroom atmosphere was active, the interaction between teachers and students was full, and the cooperation between students was close. This teaching model can better show the accuracy of students' acquisition of relevant materials and the rapid progress of language expression.

4.2 Questionnaire

At the end of the course, a questionnaire survey was conducted to understand the evaluation of students in the experimental group on the flipped classroom teaching model supported by the learning platform. A total of 56 questionnaires were distributed in the experimental class, and 56 valid questionnaires were recovered. SPSS software was used to process and analyze the data. The results show that the unstandardized α coefficient value of the questionnaire is 0.956 (greater than 0.9), the KMO value is 0.833 (greater than 0.8), and the significance probability value $P < 0.01$, indicating that the questionnaire has high credibility, and there are many common factors among variables, which is suitable for factor analysis. The statistical results of experimental class students' evaluation on the effect of flipped classroom teaching model are shown in Table 1.

Table 1. Investigation on the effect of flipped classroom teaching based on chaoxing platform

Teaching effect	Assent /%	Average/%	Dissent /%
Facilitates mobile learning	95.74	4.26	0.00
Facilitates exchange communication	87.23	8.51	4.26
Facilitate resource sharing	81.91	15.96	2.13
Improving self-learning skills	77.66	11.70	10.64
Empowering collaboration	72.34	18.09	9.57
Exercising expression skills	79.79	8.51	11.70
Livening up the classroom atmosphere	90.43	4.26	5.32
Enhancing learning outcomes	88.30	7.45	4.26
Stimulate interest in learning	75.53	17.02	7.45

As can be seen from Table 1, the flipped classroom supported by the Learning Pass platform is helpful to promote learning. On the one hand, the rich resources on the learning communication platform facilitate students to learn anytime and anywhere by using smart phones. The learning communication class group provides a fast and convenient communication platform between teachers and students, strengthens the connection between teachers and students, and contributes to the smooth development of the course. On the other hand, most students believe that the flipped classroom teaching model integrating micro-class and cultural case teaching method can improve students' mutual cooperation ability, self-expression and communication ability, and comprehensively improve their comprehensive abilities. Finally, students also believe that the flipped classroom teaching mode combined with Learning-Pass software can stimulate learning interest and invigorate classroom atmosphere. The final result is a more solid grasp of knowledge, a deeper understanding and a better learning effect.

4.3 Analysis of Final Grades

Because the two groups were evaluated differently, we compared their scores on the final exams they took together. The marking process is streamlined, with the same marking criteria and the same teachers marking the scripts. The test results showed that the average score of the experimental group was 75.73 and the average score

of the control group was 70.22. The difference between the experimental group and the control group was statistically significant ($P < 0.05$). The results of segmental analysis of students' scores (Table 2) showed that the proportion of students in the experimental group with scores above 86 was significantly higher than that in the control group ($P < 0.05$), and the proportion of students who failed was significantly lower than that in the control group ($P < 0.05$).

Table 2. The final examination of the flipped teaching class and ordinary class

Group	Number	Text scores			
		86–100	75–85	60–75	0–60
Experimental group	56	11	25	18	2
Control group	51	5	18	26	2

5. Discussion and Conclusion

This paper proposes a flipped classroom teaching model supported by the learning platform. In the concrete implementation process, we integrate micro-class teaching and case teaching, and preliminarily verify the feasibility and effectiveness of this model. The rich functions of the learning Pass platform provide a good support platform and technical guarantee for the effective development of flipped classroom. The case teaching method improves students' learning enthusiasm, improves learning effect, and enhances students' expression and communication ability. However, at the same time, there are still some problems that need to be further improved. The flipped classroom teaching model using the learning platform can effectively stimulate students' learning interest and subjective initiative in the teaching of cultural geography, and promote the improvement of students' comprehensive ability.

5.1 Advantage Analysis

A personalized learning environment is effectively created. Teachers can design and create a personalized teaching platform according to the actual teaching needs. In subjects with a lot of content and insufficient number of learning hours, the Learning Connect platform can also effectively make up for the lack of teaching hours by sharing resources such as pictures, audio and video, providing space for students to learn on their own and improve their knowledge system. By analyzing the background data of learning pass, teachers can effectively track the individual learning track of students, such as the time and frequency of watching micro videos, and accurately understand the learning characteristics and rules of students, so as to provide more targeted guidance and help for students.

Case teaching method can effectively improve students' comprehensive ability. In classroom teaching, we combine the knowledge of Cultural Geography with local cultural geography. Students need to convert the content of logical thinking into concise language and accurately express it during discussion. Many students are unwilling to say or dare not to say at the beginning, and finally strive to say and express their views smoothly. Students' self-confidence is significantly enhanced and their expression ability is significantly improved. The teaching method increases the mutual cooperation and communication among students, and promotes the improvement of students' mutual cooperation ability.

5.2 Problems Exist

The evaluation of teaching effect requires top-level design. At present, the evaluation of student achievement is mainly based on the summative evaluation, while the flipped classroom teaching model based on the learning pass platform is mainly based on the formative evaluation. Some students find that the preparation work before class such as discussions and watching micro-videos consumes a lot of energy, and the time spent preparing for exams at the end of the term leads to a high burden. Therefore, it is imperative to change the evaluation method in the undergraduate education training program.

The large class size affects the maximization of the implementation effect. The classroom teaching of flipped classroom mode is mainly based on group discussion. Although learning pass software is used to intercut with classroom interactive teaching method, everyone has the opportunity to participate in teaching interaction, but students still feel that there are too few opportunities. At the same time, if the group task allocation is not clear enough and individual students are not active enough in group discussion, the internalization effect of knowledge of some students will be greatly compromised.

Therefore, the advantages of the flipped classroom model can be maximized by keeping the class size within a

reasonable range, while the teacher makes more reasonable arrangements for the tasks of the case discussion.

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