

Application of PAD Class in Geography Teaching—Taking “The Causes of Natural Disasters” as an Example

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Abstract: With the advancement of new curriculum reform and the development of Chinese basic education, the dilemma of traditional teaching needs to be broken, so the dual classroom emerges as the times require. Taking the course of “Causes of natural disasters” as an example, this paper applies the divided-class model to the teaching design, implements the cultivation of geography core quality, and carries out life education and disaster education to the students while learning knowledge. The practice research shows that the PAD classes can improve the traditional classroom “Cramming” teaching method, and can effectively improve the teaching quality.

The traditional classroom teaching generally refers to the “Five-stage teaching method”^[1], which was founded by the German educator Johann Friedrich Herbart in the early 19th century and developed by the educator Kailov. Although the traditional teaching mode has many advantages, it has attracted much attention in the past half century. However, from the perspective of development, the traditional classroom still has some drawbacks. The new curriculum reform demands the student-centered, the innovation of teaching methods, and the traditional classroom has some obstruction to the new curriculum reform. The traditional classroom usually takes the textbook as the center, the teacher as the main body, pays attention to the theory teaching, values the student’s achievement, the student in the study process easy to appear the theory to be divorced from the actual situation, can not use the science; Not conducive to the development of students’ thinking and personality, not conducive to the initiative of students thinking, not conducive to the cultivation of students’ creativity^[2]. With the new curriculum reform, the traditional teaching reform is imminent.

1. PAD Class

In 2014, the PAD class teaching model was proposed by Fudan University Professor Zhang Xuexin on the basis of psychology^[3]. It is a local teaching model adapted to the characteristics of Chinese students according to the current situation of Chinese classrooms. Discussion class is based on constructivist and cognitive theory^[4]; rollover class is based on constructivist and humanistic theory^[5]; project teaching and case teaching is based on Constructivist theory^[6], in addition to the educational theories mentioned above, the PAD class also incorporates the structuralism theory^[7], which advocates that students should be motivated to think, and that in the process of thinking, new knowledge and laws should be constantly explored, in the process of analyzing problems and connecting laws, we establish knowledge system, acquire our own concepts, acquire our own learning methods, and finally achieve the goal of learning. It is different from the traditional classroom to turn the classroom teaching focus from teachers to students’ autonomous learning and discussion, compared with other emerging teaching mode, it is more in line with the psychological needs and laws of students and teachers.

According to the previous research findings, PAD classes can cultivate students’ thinking, improve students’ learning enthusiasm, meet the new curriculum standards and social needs. This paper, based

on the teaching model of PAD classes, through the design of specific teaching cases, strengthens the middle school teachers' knowledge and understanding of the new teaching model of PAD classes, so as to provide reference and reference for teachers to use PAD classes in teaching.

2. The characteristics of the teaching model of PAD class

The PAD class clearly divides the teaching process into Presentation, Assimilation, and Discussion^[8]. The difference with other teaching models is to “Divide” the class, half of the time for teachers, half of the time for students to discuss, the focus is to teach and discuss the time staggered, not in the same class. The key is to introduce an internalized learning process between lecture and discussion, allowing students to learn on their own and to personalize the learning process (see Figure 1).

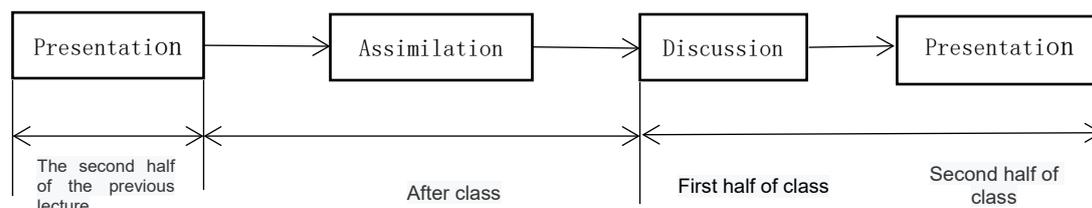


Figure 1 Flow chart for PAD class.

Presentation is teacher's teaching, the teacher constructs the knowledge frame, explains the heavy and difficult point, does not teach all contents in detail. Assimilation is students to teach the content of understanding, absorption through, and for the next class discussion to prepare. In the discussion section, the students discuss in groups and communicate with the teacher about the problems in the last class. The split-class teaching model has absorbed the advantages of the teaching method and the discussion method, and not only retains the characteristics of the traditional classroom teaching contents which are deep and systematic, rich and novel, clear and direct-viewing, also retained the discussion class to inspire the strong, guide the student to study actively the characteristic. In addition, the bisection model transforms the one-way indoctrination of teachers in traditional teaching into a “Double-subject” interaction model between teachers and students^[9], which not only systematically and efficiently teaches knowledge, but also trains students' thinking and learning ability, this coincides with the emphasis on high school geography on the development of students' thinking ability. However, the concept of PAD classes was first put forward in college, and it was first applied in college classes. The related literature shows that the application of PAD in college classroom is good, which can effectively improve the problems in traditional teaching, and also has good performance in middle school classroom.

3. The design of the split class in the course of the causes of natural disasters

3.1 Instructional Design

According to the design of the “Trilogy”, the design steps (see Figure 2) are as follows:

3.1.1 Lecture sessions

In this section, the teacher sets up the scene and teaches the new lesson. In the teaching process, the method of intensive teaching and blank space is used. Intensive teaching means that the teacher only gives guided and framed lectures, explaining the learning goals, learning difficulties and the logical structure of the contents of the chapters Leave Blank is a question that the teacher asks for the students to answer, that is, draw a tree trunk, let the students to add branches and leaves, leave room for active exploration, let the students with the task to “Fill in the blanks”^[10].

3.1.2 Internalizing the absorption link

The teacher arranges the homework, reserves the question, the student independently reads the teaching material according to the teacher instruction second study, the analysis inquiry, solves the

question, and writes the study note in the study process. The content of study notes includes the understanding of knowledge, questions with doubts and learning methods and experiences. This link is the core link of the divided class, the quality of completion determines the implementation of the divided class effect.

3.1.3 Discussion session

This section includes group discussion, group display, combing summary, teacher supplement. Students will have a group discussion with the “Results” of the internalization process. After the group discussion, each group will display the results of the study, and the teacher will make clear the answers to the questions and fill in the knowledge appropriately. In the course of discussion, the teacher makes a round-trip inspection to control the learning discipline, and finally the teacher makes a summary.

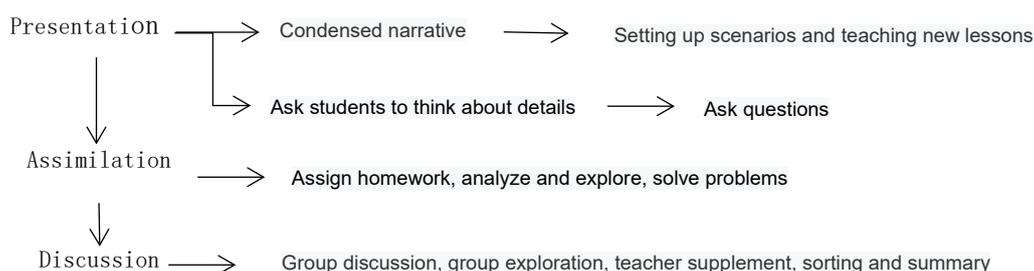


Figure 2 Instructional design steps.

3.2 The teaching process

This class is divided into two classes, taking “The cause of flood disaster” as an example in the first lesson of “The cause of natural disaster” in Unit 4, geography compulsory 1, Lu Education Press, analysis of the split-classroom teaching design ideas (see Table 1).

Table 1 Teaching design thinking under the mode of double-divided class.

Course title	Causes of natural disasters	
Textbook Analysis	The content of this section mainly analyzes the causes of flood and waterlogging in natural disasters. The study goal is to master the main distribution area of flood disaster, and the study difficulty is to analyze the cause of flood disaster and the measures of Disaster Reduction and prevention. Through the study of flood and waterlogging disaster, we can carry out life education and disaster education to cultivate students' correct outlook on life and disaster.	
Analysis of the academic situation	This lesson is located in Lu Jiao edition compulsory 1 Section 4 Section 1 second lesson, the student has already studied the first lesson, has the certain knowledge foundation, and before this has had some time study, have certain ability of geographical analysis and geographical thinking.	
Geographical core literacy goals	Regional Cognition: Induction of spatial distribution characteristics of flood and waterlogging disasters.	
	Comprehensive Thinking: combining graphic and text data, and using the knowledge to analyze the cause of flood disaster in the case.	
	Geography practice: through the video, pictures of the flood disaster observation, analysis of the causes and hazards of flood disaster, stimulate students to explore nature.	
	Harmony between man and Earth: Understanding the harm caused by flood and waterlogging.	
Teaching process		
Teaching session	Teaching activities	Teaching objectives
Broadcast the news, Setting the	PPT broadcast news clips of heavy rain in Henan, showing the severity of the disaster in Henan. Analysis of the increase in the frequency and intensity of floods	Arouse students' interest in learning, combine current affairs, provide the situation, link the

scene	in the context of global warming, with the total global population increasing by 18.6 per cent between 2000 and 2015, and the population of flood areas increasing by 34.1 per cent, and it is estimated that more people will be affected by floods in the future, and China is prone to floods.	knowledge in the textbook with the real life, let students feel the danger of flood disaster.
Guide the direction and build the framework	Through the presentation of two major disasters, flood disaster in 1998 in the Yangtze River, Nen River River, Songhua River River, and flood disaster in southern Thailand in 2011, the concept of flood disaster was introduced, analyze and explore the difference between flood disaster and waterlogging disaster	Teachers provide students with problem situations, frame of knowledge structure and guide the construction direction. Through case analysis, theory combines with practice, trains students' ability to read pictures, and improves students' ability to collect, analyze and combine information, enhance the ability of summing up and induction and logical thinking of students. In the process of learning to cultivate the patriotic feelings of students, deepen the understanding of the flood disaster.
	The pictures of flood disaster in Henan show that flood disaster in Zhengzhou and flood disaster in some areas. It is found that the heavy rain in Henan province has the characteristics of long duration and wide range of heavy rain, but the heavy rain in Henan province also has the characteristics of extreme precipitation, with the development of economy and society, there are more and more cement ground in the city, which will seriously affect the infiltration of precipitation and increase the surface runoff. The two disasters are more serious than the urban waterlogging in Henan province.	
	Teachers summed up the cause and mechanism of the flood from two aspects of natural factors and human factors.	
	Display China flood disaster distribution map, China Topographic map, China climate distribution map, precipitation distribution map and Zhengzhou City Landscape Map. Figure Reading Inquiry: 1. Try to analyze this Henan rainstorm and cause flood disaster reason? Think in terms of nature. 2. What is the reason of waterlogging in Zhengzhou City? Find out through Reading Pictures: 1. Henan province is located in the east of China, in the middle and lower reaches of the Yellow River and the monsoon. The west is high, the East Low, the east is a vast North China Plain, low and flat, the Yellow River runs through the east and west, drainage is not smooth. 2. Zhengzhou has a large amount of hardened ground and a low capacity of surface infiltration; the hydrological conditions of the city have been destroyed; the city is short of sewers and the construction of drainage systems lags behind; the vegetation is sparse and the reservoirs are small, so the capacity of water conservation is small and the rainwater can not be Stored.	
Setting aside questions, Set Up a job	After-class elicitation 1: Based on the analysis of rainstorm in Henan province, the spatial distribution characteristics of flood and waterlogging disasters are Summarized.	Question 1 is to let students grasp the general law through individual cases, guide students to use the knowledge to solve the ability of geography problems in life
	Second, try to find out the four "Multi-flood areas", and induce the characteristics of topography and climate, analyze the causes of frequent floods in these areas.	Question 2 is to assist students to explore independently, guide students thinking direction.

	<p>After-class heuristic inquiry 3: try to analyze the flood disaster, city waterlogging prevention and control measures? What should we do when the flood comes?</p>	<p>Question 3 guides the student to ponder, carries on the life education and the disaster education to the Student.</p>
	<p>Teachers provide students with information about China's flood distribution map, China's topographic map, China's climate distribution map and new cities, and make it clear to students once again that they need to think independently and solve problems in the process of internalization and absorption. The arrangement study note, the teacher urges, supervises the student independent study, completes the internalization absorption.</p>	<p>By setting aside questions to guide students' thinking, students are encouraged to explore on their own.</p>
<p>Active discussion, Fill in the gaps</p>	<p>Students will be divided into groups of four. They will share their study notes, show their achievements, discuss the three questions after class, and put forward some doubtful questions.</p>	<p>In the course of discussion, we can deeply understand the harm of flood and waterlogging, realize the insignificance of human beings in front of nature, understand the importance of life, and cultivate the consciousness of protecting the environment and loving nature. Enhance students' sense of participation in class and stimulate students' thinking.</p>
	<p>Group discussion, each group to share the results of learning, each group members raised questions after the discussion still have doubts, the group discussion to answer. If you still can't solve the problem after discussion, ask the teacher. Teachers made rounds of the school to keep the discussion orderly and to keep in touch with the students to keep abreast of their learning</p>	
<p>clear answers, Class discussion</p>	<p>After-class elicitation 1: Based on the analysis of rainstorm in Henan province, the spatial distribution characteristics of flood and waterlogging disasters are summarized.</p> <p>The flood and waterlogging disasters occurred mainly in the monsoon, especially in the middle and lower reaches of the great rivers, where the summer rainfall was more short and heavy, and the plain area was low and flat and densely populated.</p>	<p>Teachers clearly explore the answers to the questions, ensure the quality of students' learning, help students to find and fill gaps, while students are thinking repeatedly, carry out life education and disaster education, and deepen students' perceptual knowledge, strengthening the dialectical unity of contingency and necessity.</p>
	<p>Second, try to find out the four "Multi-flood areas", and induce the characteristics of topography and climate, analyze the causes of frequent floods in these areas. The flood disaster areas in China are mainly distributed in the northeast, the Yellow River and the Yangtze Plain, the Huai River River basin and the Pearl River basin. The topography is characterized by low and flat terrain, mainly plain, poor drainage; the climate is characterized by monsoon, summer rainfall concentration and heavy rainfall, prone to flash floods, debris flows and landslides caused by heavy rainfall and other geological disasters.</p>	
	<p>After-class heuristic inquiry 3: try to analyze the flood disaster, city waterlogging prevention and control measures?</p> <p>Flood prevention and control measures: Engineering measures: Afforestation, soil and water conservation; Strengthening River regulation, levee construction and reservoir construction. Personal Prevention and avoidance: pay attention to the weather forecast and learn self-help skills; when flood comes, move to the hillside or high ground; when you find the wire drooping or breaking, the high-voltage wire tower toppling, you should stay away from danger, do not</p>	<p>We should cultivate students' ability of geographical analysis, deepen their understanding of the danger of natural disasters, learn to deal with natural disasters rationally and scientifically, and improve their awareness of disaster prevention and reduction.</p>

	come close to touch, in case of electric shock, life-threatening. Prevention and control measures for urban waterlogging: River regulation; renovation of underground pipe network; rational planning of drainage facilities; increase of drainage facilities; increase of storage capacity: building “Sponge city”, “Resilient city”, building cisterns; increase of infiltration capacity: laying permeable pavement; strengthening of monitoring and Forecasting.	
Teachers’s upplement, Divergent thinking	Teachers in the PPT to show the city underground space and wetland city related information, guide students to think about both the principles of flood disaster mitigation.	Introduce the new concept of city construction to students, cultivate their love of geography, and expand their knowledge.
Carding summary Review and reflect	The teacher summarizes the knowledge points of this lesson, leads the student to carry on the review reorganization, helps the student to comb the knowledge system, the clear knowledge frame.	To ensure the effectiveness of teaching, in the summary of the teaching process for reflection, timely discovery of problems, solve problems.

The development of geography education is not achieved overnight, but is a process of continuous exploration in practice and improvement in exploration. However, there are also problems with the PAD class, where discussion sessions in the PAD model are prone to low-level loops.. In Teaching, the teacher is required to supervise the students’ study in the internalization link, to strengthen the intervention in the discussion link and to grasp the students’ study situation at any time. In addition, teachers should improve their own teaching ability, master students’ learning conditions, choose the right way of grading in teaching design, and first choose the less difficult courses according to students’ own conditions, and then divide them step by step, gradually improve the learning ability of students. With the practice of the PAD class in more and more middle school classes and the application and improvement of more and more teachers, the PAD class model will be more suitable for middle school teaching and inject new vitality into the middle school classroom.

4 Summary

The PAD class is suitable for high school geography teaching and can make up for the problems existing in the traditional teaching through the analysis of the questionnaire, the teaching effect of PAD class in middle school classroom is ideal. However, there are still some problems in the implementation of middle school classroom, such as the low efficiency of students in the discussion link, the low completion of homework, and the difficulty of students' adaptation. Only by constantly summing up experience in practice and constantly improving can the PAD class play a greater role. Due to the special teaching mode of PAD class, there are certain requirements for the classroom when it is implemented. The PAD class requires rich and enlightening teaching materials, and teachers need appropriate supplementary materials according to the teaching content. Therefore, the PAD class is more suitable for areas with superior teaching resources. The PAD class requires that the teaching content be enlightening and open to a certain extent, can give full play to students' personality, and requires that students have a certain self-learning ability and a high degree of cooperation. Therefore, when using the PAD class, teachers should judge whether to use the bisection mode and which bisection form to use according to the teaching content and students' situation, and do not blindly follow. Due to the limitations of objective conditions and the lack of research ability of the author, there are still many deficiencies in this study. There is still a long way to go in the application of divided classroom in senior high school geography.

The development of education is not achieved overnight. It is a process of continuous exploration and improvement in practice. You never know what you have to do. With the practice of PAD class in more and more middle school classrooms, and with the application and improvement of more and more teachers, the problems in the application of PAD class will be more optimized and solved, which will be more suitable for middle school teaching and inject new vitality into the middle school

classroom.

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