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Research on the Development of Cooperative Learning and the Implementation of Strategies in Biology Classroom

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Abstract

Cooperative learning is a mode and strategy based on collective learning, which has high value in modern classroom teaching. At present, the most creative and practical teaching mode adopted by most countries in the world is cooperative learning. Cooperative learning has been widely used in the classroom teaching mode. Recently, it has been increasingly used in the biology classroom of junior high school, and gradually has demonstrated the benefits and advantages that the traditional classroom mode cannot bring. The cooperative learning strategy is helpful to improve the students' interest in learning, enhance the students' collective consciousness and achieve the teaching goals. Therefore, this paper reviews the development of cooperative learning, summarizes the types of cooperative learning, and finds that cooperative learning can enrich biological classroom teaching activities and improve the quality of biological teaching. At last, it analyzes the strategy of cooperative learning in biology classroom, which has important theoretical significance and application value for the continuous improvement of quality in biology education.

Keywords: Cooperative learning; Development; Biology classroom; Implementation strategy.

1. Introduction

With the development of the new curriculum reform in China, teachers are required to take students as the main body of learning in teaching, and cooperative learning is in line with this goal, so it has been actively responded by teachers. In the nine-year compulsory education stage, all subjects can apply the group cooperative learning mode. When applying cooperative learning in junior middle school biology teaching, we need to realize that cooperative learning can not be suitable for solving all learning problems, and also need teachers to think actively and apply it reasonably. In the actual biology classroom teaching, teachers should master the actual situation of each student, study the biology textbook in junior high school deeply, combine the learning content with the cognitive law of students, so as to give full play to the role of cooperative learning mode and get better teaching effect.

Since entering the 21st century, under the background of the steady development of social economy, the level of biology teaching in junior middle school in China has become more and more mature, and the society has put

forward new requirements and standards for biology teaching in junior middle school. In order to actively meet the development trend of the times and meet the increasingly strict teaching requirements, the focus of biology teaching in junior high school has gradually changed to cooperative learning. At the same time, from the current level of junior high school biology teaching, there are still many problems to be solved. For example, lack of teachers, backward teaching ideas and single teaching methods, and even a small number of teachers do not care enough about students to meet the needs of students' progress, not only directly affect the biological teaching effect, but also hinder young teachers' professional growth and follow-up research, and small combination learning can solve the above contradictions to a certain extent. Among them, cooperative learning steps can be divided into driving tasks, independent inquiry, cooperative learning and exchange comments. It is proposed that both sides of teaching should abide by relevant rules to select appropriate teaching content, achieve inquiry learning and independent learning, and achieve the goal of quantitative recording and evaluation of group learning process. In view of this, this paper reviews the development of cooperative learning, summarizes the types of cooperative learning, and finds that cooperative learning can enrich biological classroom teaching activities and improve the quality of biological teaching. At last, it analyzes the strategy of cooperative learning in biology classroom, which has important theoretical significance and application value for the continuous improvement of biology education quality.

2. The Emergence of Cooperative Learning

Cooperative learning originated from the concept of education in western countries. In the period of ancient Rome in the first century A.D., the Kunti Liang school put forward the view that students can learn from each other. In the Renaissance, Comenius, a Czech educator, proposed that "students can learn not only from teachers' teaching, but also from other students" (Bai, 2011). In the early 18th century, English pastors bell and Lancaster began to promote the guidance system, and cooperative learning was widely recognized in England. In the early 19th century, American educator Parker further studied and advocated cooperative learning, making cooperative learning the most important teaching method in American classroom at that time (Yu, 2017). At the beginning of the 20th century, Dewey, an American scholar, inherited Parker's cooperative teaching method and thought that cooperative learning is an important part of design teaching, advocating group cooperative learning in Teaching (Ding, 2005). These theories and practices put forward in the early stage provide valuable experience for the development of cooperative learning in the modern sense, and promote the rapid development of cooperative learning theory in the educational circles of various countries.

Cooperative learning in the modern sense started in the United States in the early 1970s, and made substantial progress in the mid-1970s, becoming an influential teaching theory and strategy in the world (Zhang *et al.*, 2010). During this period, the research results on group cooperative learning methods emerge in endlessly, including the method of group achievement division proposed by Professor Slaven, group assisted individual learning, group game competition (Ge *et al.*, 2011). The method of cutting and splicing designed by Allen and his colleagues, the group investigation method developed by Professor Sharon and his wife, the co-learning method developed by Johnson Brothers and the structural method created by Kagan, etc. Since the 1980s, a large number of scholars have studied the effect of cooperative learning, among which the majority support cooperative learning better than individual learning (Wang, 2004). By the end of 1990s, researchers had explored cooperative learning from different perspectives such as institutional analysis, interpersonal analysis and dialogue analysis (Palincsar, 1998), and the research of cooperative learning turned to the analysis of cognitive process.

From the rise of cooperative learning in the modern sense to the application of cooperative learning in the teaching of primary and secondary schools in dozens of countries, only after a few decades, researchers have made a lot of research results, formed a wealth of cooperative learning theory, making group cooperative learning a new teaching method with great creativity and effectiveness.

3. The Development of Cooperative Learning in China

The theory of cooperative learning in the modern sense was introduced into China in the late 1980s, and has become a research hotspot of domestic education and teaching since the implementation of the new curriculum reform (Zhou, 2017). In 1987, Zhu Peirong, a Chinese scholar, translated the cooperative pedagogy created by the Soviet educationists and published it in the foreign education materials, explaining the relevant contents of cooperative learning. In 1993, Shandong Institute of education carried out a six-year research project of "cooperative teaching research and experiment", during which it was guided and helped by Slaven, a representative of cooperative learning. The research results confirmed that cooperative learning can not only improve students' academic performance, but also cultivate students' innovative spirit and even improve their practical exploration ability (Xu, 2002), it lays a foundation for the follow-up research in China. Professor Wang Tan, a researcher of Shandong Institute of education, has published many books on cooperative learning, such as introduction to cooperative learning, analysis of basic types and concepts of cooperative teaching, etc? In the 1990s, scholars made great efforts to explain the rise of "cooperation fever" and cooperation revolution in American primary and secondary schools (Sheng, 1990), and pointed out that the teaching reform carried out by American primary and secondary schools to cooperate in communication and learn to communicate in cooperation is conducive to improving the ethnic relationship in the United States and creating a good classroom social psychological atmosphere.

After the 21st century, there are more in-depth researches on Cooperative Learning in our country. There are dozens of teaching experiments about group cooperative learning, including the exploration of Personality Optimization education carried out by the Department of education of Hangzhou University, the experiment of

children's subjectivity development carried out by the Department of education of Hunan Normal University, the experiment of collaborative teaching carried out by the Department of education of Beijing Normal University "Experiment on the development of children's subjectivity", etc. (He, 2009). By referring to the relevant literature, the author found that since the new curriculum reform, cooperative learning research involves a wide range of subjects, including English, mathematics, Chinese, etc. (Zeng and Tian, 2014). The majority of teachers apply cooperative learning theory to the teaching of specific subjects, hoping to change the traditional teaching mode and cultivate students' sense of cooperation and cooperation ability. In 2001, the State Council issued the decision on the reform and development of basic education, which proposed "encouraging cooperative learning, promoting mutual exchange and common development between students, and promoting the teaching and learning of teachers and students" (Mao, 2008), and advocated cooperative learning in teaching. Under the background of the current new curriculum reform, the majority of teachers should innovate the educational concept, change the "full class" situation of the traditional classroom, and promote the overall development of students through group cooperative learning.

4. Main Types of Cooperative Learning

There are three main types of theories and practices of cooperative learning at home and abroad, namely, cooperative teaching between teachers and students, cooperative teaching between students and students, and cooperative teaching for all. (1) Cooperative teaching between teachers and students: the former Soviet Union "cooperative pedagogy" represented by cooperative teaching between teachers and students, based on mutual respect and cooperation between teachers and students, not only pays attention to guiding students to learn, but also pays attention to the common work of teachers and students (Wang, 1999). Cooperative pedagogy takes the cooperation between teachers and students as the starting point to explain the problems of education and teaching, and considers that the cooperation between teachers and students is the most basic aspect of school interpersonal (Wu, 1991). It advocates the establishment of close cooperative relations between teachers and students, between students, between schools and families on the premise of mutual cooperation and mutual respect. (2) Cooperative teaching of students: the cooperative teaching of students is represented by "cooperative learning" in Europe, America and other countries. It takes the collectivity of teaching process as the premise, attaches importance to the interaction between peers, adopts cooperative learning groups in classroom teaching, and constructs a classroom teaching structure with the basic characteristics of student interaction. By carrying out group cooperative learning activities, students can learn autonomously or communicate with their peers, so as to promote the collaborative development of students' personality and group character. (3) Full cooperation teaching: full cooperation teaching, represented by the "cooperative teaching theory" proposed by Chinese scholars, is an innovative teaching theory proposed by Chinese scholars on the basis of learning from the research results of cooperative education and cooperative learning at home and abroad. The characteristic of full-staff cooperative teaching is full participation, which emphasizes the interaction and cooperation among all teaching dynamic factors, including teacher-teacher interaction, student-student interaction and teacher-student interaction cooperation (Yu, 2012). It has the advantages of both teacher-student cooperative teaching and student-student cooperative teaching, and is a more comprehensive and effective cooperative learning orientation.

5. Cooperative Learning Enriches Biological Classroom Teaching Activities

Some studies have shown that cooperative learning can help enrich the biological classroom teaching activities, improve the learning interest of middle school students, and enhance the collective consciousness of students. Comenius, a Czech educator, put forward the principle of education adapting to nature, advocating that education should follow the rules of things movement and human nature, and not violate the natural development. School education should choose appropriate ways to conduct teaching activities according to the laws of children's physical and mental development at all levels (Sun and Gao, 2017). The object of education in junior high school is the group of young people born after 2005. They have distinct personality and independent consciousness. They show their unique characteristics of the times in emotional psychology, cognitive ability, personality and behavior (Li, 2019). They are most interested in new things. They are usually easily disturbed by external things when they study, so they can't concentrate for a long time. The traditional teaching mode of teachers' speaking to students can not effectively maintain students' interest in learning and reduce the learning effect, so it is required that education should be combined with the characteristics of the current education object, learning psychology and the characteristics of the times. Cooperative learning is in line with the age and psychological characteristics of junior high school students. It can ignite their enthusiasm for learning, enrich and diversify their teaching activities, promote their mental health and learning, and meet the needs of young people in the new era. Therefore, cooperative learning not only enriches the biological classroom teaching activities, but also improves the quality of biological teaching.

The core of cooperative learning is to put students in the main position of teaching. The basic teaching method of cooperative learning is that under the arrangement and guidance of teachers, students learn independently in groups. The process of group learning is basically that students learn and understand first, then communicate and discuss in groups, or learn knowledge and cultivate students' comprehensive ability through operation, experiment and other activities. The whole teaching process is based on students' initiative learning, and teachers only play a role of guidance and guidance in the process of teaching. To put students in the main position of teaching, we should design and select the teaching content that is conducive to students' participation in the whole process of teaching and learning, so that students can actively participate in learning and become the main body of teaching. Therefore,

cooperative learning can enrich the teaching activities of biology class and improve the comprehensive ability of students.

The cooperative learning activities of students are not only the performance of students themselves, but also lay the foundation for the publicity of students' personality. In the biological cooperative inquiry experiment, we can consciously create a relaxed and pleasant atmosphere for students to explore together. In such a classroom, students are in a happy mood to study independently, explore freely, communicate with each other, and acquire knowledge easily. The boring classroom is also interesting, which greatly improves the effectiveness of classroom teaching and stimulates the enthusiasm of students' exploration. At the same time, it also improves students' cooperation ability, experiment ability and cooperation ability.

6. Cooperative Learning to Improve the Quality of Biology Teaching

The reform of basic education puts forward higher requirements for education and teaching, requiring that all disciplines should take students as the main body and cultivate the quality of students in all aspects. Under the requirements of the reform of basic education, cooperative learning has played an increasingly important role (Xu, 2017). Cooperative learning is essentially different from traditional classroom teaching in that it carries out learning activities in groups. Cooperative learning helps students actively think, explore, analyze, discuss and solve practical problems in the process of interaction, enables students to learn how to treat, evaluate, standardize, coordinate, recognize and respect themselves and others in the process of cooperation, exercises "emotional ability" (Lu and Sun, 2010), changes learning methods, and lays a solid foundation for lifelong learning. The knowledge of biology in junior high school is more basic than that in senior high school, but the knowledge covers a wide range and can cultivate students' interest in biology. Some knowledge involved in the junior high school stage, such as exploring the influence of non-biological factors on the rat woman, investigating the biological species on campus, observing Paramecium and so on, can lay a good foundation for students' independent learning, scientific exploration and cooperative communication. To carry out cooperative learning activities in junior high school biology teaching can effectively improve students' interest and passion in learning, help students learn from each other and improve their comprehensive quality in cooperation (Ji, 2015). Cooperative learning provides new ideas and new ways for the teaching reform of our country. Junior high school biology teaching should use this teaching mode to promote the basic education reform of our country.

For a long time, students' learning of biological knowledge is mainly based on individual learning, and the learning process has been monotonous and boring repetitive learning and passive memory, which is easy to make students' interest in learning biology is not strong, and their enthusiasm for learning is not high. As time goes by, students are tired of learning biological knowledge, resulting in the impact on the overall teaching quality of biology. Teachers must change the existing passive learning mode of students and find a new mode that can attract students' interest and arouse their enthusiasm for learning. Cooperative learning can make students change from monotonous individual learning to lively and interesting mutual learning, from passive memory to active memory, and make the classroom colorful. Through cooperative learning, students' enthusiasm for learning biology can be fully mobilized, students' comprehensive application ability of learning biology can be improved, traditional teaching mode can be changed, and finally better teaching effect can be achieved.

Teachers can assign some extracurricular cooperative learning tasks according to students' interests, and insist on the way of more encouragement and less criticism to give students more affirmation and praise, so that students can gain more confidence and enthusiasm, so as to improve their biological learning performance. By creating a lively and relaxed learning atmosphere, a variety of cooperative learning methods can be formed to make students love biology. Through cooperative learning, students can learn better, regard learning as a pleasure, arouse their enthusiasm for learning biological knowledge, and promote students' continuous progress. Classroom teaching has become a world of autonomous learning, cooperative learning and inquiry learning. Students participate in the whole process of learning. Students' ability to use knowledge comprehensively has been comprehensively improved, thus promoting the continuous improvement of the quality of biology teaching.

7. Strategies of Cooperative Learning in Biology Class

7.1. Create Situations and Stimulate Students' Awareness of Cooperative Learning

Biology is a subject closely related to production and life, and it is also related to many social hot spots. The new curriculum reform also caters to its characteristics and increases many problems in production and life, which determines that the problem of biology is not only a matter of concept and law. Teachers should make full and reasonable use of the first biology class in junior high school, let students have a strong interest in biology learning at the beginning, and let students understand the significance and value of cooperation, so that they can better integrate into a collective. On this basis, the teacher divides the students into different study groups, making full use of the cooperation between the students and increasing the fun of learning. Einstein once said, "Interest is the best motivation for learning." Before learning, students can get twice the result with half the effort by arousing their interest in learning. Teachers should also put forward some difficult problems according to the progress of teaching and improve their ability to solve problems. For example, in the course of "investigating biology on campus", students should start from the actual situation of their own school. Because the campus environment includes: vegetable garden, garbage corner, ditch, lawn, elm wall and willow forest, etc., what runs through the above six points is a circuitous investigation route.

Before the arrangement of group cooperative learning, it is necessary to investigate the conditions of creating the situation in time to understand the learning situation of the class, including the enrollment results, learning attitude, learning ability of the class, activity of the class, learning ability of excellent students, etc. At the beginning of enrollment, a survey was conducted on the biological knowledge of the class. The results showed that students' learning basis and learning ability were different, their learning habits were poor, their learning ability was insufficient, and the class with more difficult discipline control reflected the general low interest in learning biology. From the above understanding, in order to improve the learning situation of the class as a whole, we can use the method of group cooperative learning, create a certain situation, and constantly stimulate students' awareness of cooperative learning.

Before the establishment of cooperative learning group, we need to focus on the excellent students and the students with weak foundation in the course of class, from which we can find that there are many students with strong learning ability in each class. At the same time, there are also a group of students with low learning consciousness and poor foundation. In the course of classroom teaching, this group of students with weak learning ability and poor discipline are careless in learning, speaking small words in the classroom, interrupting at will, deliberately disturbing the classroom order and affecting the whole class level learning process. Therefore, it is necessary to create a situation to attract students' attention, let students focus on complex biological individuals, increase their interest in learning, and improve their awareness of cooperative learning.

7.2. Choose Cooperative Learning Based on Teaching Objectives and Teaching Materials

As the only subject of learning, all the teaching modes and behaviors serve the students' learning, so that they can develop better and learn to learn, so as to lay their learning foundation. At present, cooperative learning is one of the best ways to improve learning efficiency. Teachers must adjust the grouping and choose the right teaching method according to different teaching objectives. Therefore, teachers must do a good job and take this important choice, remember not to put all the eggs into the basket of cooperative learning.

Any teaching activity should have a clear teaching goal. As far as biology in middle school is concerned, teachers need to set a certain teaching goal and consider the content of teaching materials. Teachers must make learning objectives according to students' knowledge level and cognitive law, so teachers should understand students' mastery of biological knowledge learning by combining homework and investigation before teaching. Know the current knowledge level and related skills of students, and then make clear the knowledge and ability that students want to acquire in the upcoming learning. Therefore, the formulation of teaching objectives and the content of teaching materials are very important for cooperative learning.

7.3. Cultivate Students' Cooperative Learning Skills Imperceptibly

In the traditional teaching mode, students are passive and receptive learning. This is also the root cause of students' conflict with the classroom at present. There is no interaction in this way, only the teacher's unilateral output, and the mere form of interaction can not save the embarrassment of the classroom. Cooperative learning is different. In the classroom of cooperative learning, teachers and students, students and students can interact with each other. It is to improve the activity of the classroom in the form of student interaction, and to carry out teaching. Cooperative group is the epitome of a class. Within the group, each student is different in all aspects. Their academic performance, life experience and problem-solving ability are all different. However, through their cooperation with each other, they can achieve their learning goals together, so that they can share weal and woe, and share weal and woe with the group, which will make them have more fun in learning. This helps to cultivate the sense of cooperation among students, and also enables them to understand and respect each other, to accept the refutation of different opinions, and to be good at listening, so as to realize sharing. Cultivating their sense of cooperation is a step-by-step process, which requires teachers to consciously carry out long-term training, so that students can experience the joy of cooperative learning.

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