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Learning by Doing-thinking --On the Effective Teaching of Junior High School Biology

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Abstract

Mr. Tao Xingzhi once said: "Learning by doing, teaching by doing." The traditional "textbook-centered" biology classroom is designed by teachers to display their teaching content according to the rules and regulations. The originally lively and interesting biology class has become monotonous and boring. "Learning by doing" is the abbreviation of the National Science Education Reform Project in the context of quality education. Actively practice the idea of "learning by doing" in biology teaching, and put more emphasis on the role of "doing". It is necessary for students to learn knowledge through hands-on and encourage students to take the initiative Brain and hands-on activities develop the good habit of independent learning and independent thinking, so as to achieve the purpose of quality education.

Keywords

Tao Xingzhi's Thought; Learning by Doing; Thinking by Learning; Junior High School Biology; Teaching Strategy.

1. Introduction

In a modern society where information and knowledge are highly developed, biology teaching is related to the reserve of relevant technical talents in our country, and it is also related to the development of life and the progress of mankind. The discovery of the double helix structure of DNA molecules and the birth of cloning technology all demonstrate the progress that biology has brought to human society. However, the traditional "listening to middle school" teaching model is still clearly visible in the current biology teaching, which inevitably leads to the emergence of students with "high scores and low energy". As an important teaching activity course, biology should have its own characteristics and innovation.

Mr. Tao Xingzhi's educational idea of "integration of teaching and doing" believes that only by focusing on "doing", learning by doing and teaching by doing can effectively promote students' independent learning. "Learning by doing" is not only an educational concept, but also a teaching plan, which advocates that students actively and creatively solve problems. Under the guidance of Xingzhi thinking, the teaching mode of "learning by doing, thinking by learning" is applied to biology courses, which helps to develop students' innovative ability, improve the efficiency of biology teaching, and promote the formation of knowledge and the enhancement of ability.

2. Language Transmission to Stimulate Interest in "Doing"

Classroom teaching is the main form of school education, and the language of instruction is an important means of conveying emotions and enlightening thinking. A lot of teaching practice shows that students lack learning enthusiasm for knowledge that they are not interested in, which in turn affects the learning effect of the entire class. In the "learning by doing" teaching model, more emphasis is placed on the display of the charm of the teaching language. In biology courses, the teacher's language must be scientific, inspiring, logical and pedagogical. The

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"external cause" and "internal cause" of ", only through the combined action of internal and external causes can arouse students' thinking and help them master biological knowledge more accurately.

A good design of the teaching language for each lesson is an important guarantee for motivating students to take the initiative and learn actively. In the teaching of "Microbes in the Soil", the teaching goal of this lesson is to help students understand the relationship between bacteria and fungi and food production, and learn to appreciate the results of other people's labor. Therefore, sharing the process of making things in the classroom stimulates students' interest and desire to "do". Among them, the effective guidance of the teaching language is the key. For this reason, the author designed this teaching language:

Teacher: When we talk about "bacteria" and "fungi", we usually think of their disadvantages, which can cause food spoilage, human diseases, etc. Then, does the existence of bacteria and fungi really have only disadvantages and no benefits? The answer is of course no. In the previous study, I believe many students have already understood the benefits of bacteria and fungi, which can not only turn waste into profit, but also allow them to enjoy some delicious things! First let us recall:

(The multimedia shows the photos, the teacher will continue to guide)

Teacher: These photos are the scenes of several teachers making yogurt, sweet wine and other food together. Look, how happy the teachers are laughing!

(Through the creation of picture situations, a relaxed and pleasant atmosphere is created, supplemented by language stimulation, to mobilize students' interest in "doing".)

Teacher: So, do you want to try it yourself? Let us work together, brains, mouths, cook, taste, pay attention to hygiene, and after tasting, choose the most delicious food in your mind, and put your vote on the voting card in front of the podium. On paper.

(Delicious food has the temptation to resist for students. Students try it out in an orderly manner, and after choosing the most delicious food, they have a happy communication with the students.)

Teacher: Students, you must be wondering, why are the fermented foods made by these students so delicious? So creative? Now let our award-winning students come to the stage to share their experiences with everyone.

The teaching language of the whole class has the characteristics of echoing, connecting the previous and the next, and is close to the life-oriented language, which not only allows students to quickly understand that the teaching focus of this lesson is bacteria and fungi, but also stimulates students' enthusiasm with the cooperation of pictures and language. Interest in "making" food, and enjoy the ups and downs of practice and joy in the process of "making".

3. Practice Activities to Enhance the "Doing" Experience

The core essence of the new round of curriculum reform in my country is to change the way students learn, and to actively advocate "learning by doing" activities in education and teaching. In the junior high school biology curriculum, it is mainly divided into two forms: "doing experiments" and "doing activities". The in-depth processing and understanding of the knowledge and skills taught will not only enable students to master the knowledge more thoroughly and clearly, but also And it allows them to apply the knowledge they have learned to life practice, thereby promoting the effective improvement of classroom teaching efficiency.

The essence of the educational theory of "integration of teaching and doing" advocated by Mr. Tao Xingzhi lies in hands-on practice. It is necessary for students to acquire knowledge and experience the formation process of knowledge through scientific inquiry and personal

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experience, so as to comprehend the scientific ideas and grasp the scientific methods contained therein.

3.1. "Do" Experiments and Master Biological Experiment Skills

American educator Dewey once said: "All learning is a by-product of action, so teachers must'do' to encourage students to think and learn knowledge." Biological experimentation is an important part of biology, but it has always been Because of this or that reason, it has not been effectively carried out. Many teachers think that "doing experiments" is too time-consuming and not very effective. In fact, with the development of modern educational technology and the school's large investment in experimental equipment, it can be said that the development of experimental courses is not difficult. The only difficulty is the transformation of teachers' education and teaching concepts. Take the teaching of "The Respiration of Plants" as an example. Because many students lack intuitive experience of the respiration of plants, they pay more attention to the photosynthesis of plants and ignore the respiration. The reason is that the students have not personally experienced and experienced it. Therefore, in the teaching of this lesson, the author takes "human respiration" as the reference object, and changes the "validating experiment" in the textbook to "exploratory experiment" to help students actually feel the breath of plants and get their breath Basic knowledge of the role.

Exploratory experiment 1: (Small experiment on carbon dioxide produced by human breathing) Ask two students to blow up balloons separately, and guide the students to think about which component of the exhaled air and the exhaled air in the two students will increase? How to verify it?

Exploratory experiment two: (whether plant respiration produces carbon dioxide) Students are divided into groups to take 4 equal parts of the same material, among them, two equal parts are cooked and two equal parts are fresh, and they are placed in 330mL transparent white beverage bottles. Sealing process in the middle, and affixed with different color labels. (The plastic bottle with green leaves is wrapped in black cloth)

Each team prepares 2 bottles of 10mL clarified lime water and fills them in 20mL plastic bottles; uses a 50mL syringe to draw 40mL gas from the two cooked and fresh beverage bottles, and then inject them into the clarified limewater to observe the experimental phenomenon.

Students obtain experimental results and display, evaluate and communicate the results within the class to achieve a unified understanding of experimental phenomena. In this way, students understand the basic principles of "plant respiration" through "doing" experiments, and are also deeply aware of the importance of plant respiration.

Some teachers don't understand why it is so troublesome to let students do experiments. This is because the exams cannot detect the true degree of students' knowledge and skills. You only need to memorize the experimental steps. Therefore, the author believes that only by "doing" experiments and letting students experience and hands-on personally can they have a better interest in science and can effectively master biological knowledge and skills. This is what we should see in biology teaching.

3.2. "Do" Activities, Learn How to Transfer Knowledge

Compared with a single biological experiment, colorful and diverse biological activities can more arouse students' emotions of active participation and active experience, and restore knowledge to life, truly let students "do while playing and learn by playing" . Taking the teaching of "Flowering and Fruiting of Plants" as an example, in order to enable students to better grasp the structure of flowers and the process of fertilization, the author carried out a classroom activity of "Peach Blossom Model Making". The students were given waste foam, toothpicks, paints, infusion tubes, scissors, colored paper, thin threads and other materials, and the models were made in groups of three. Some students in a group have strong hands-on skills.

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They quickly used waste foam to make stamens and pistils, and then cut out the petals, leaves and sepals of the peach flower with colored paper, and used iron wire to shape the structure of the peach flower. Other groups use foam as anthers and iron wire as filaments. In the process, the groups that don't understand learn from the better ones, and soon the peach blossom structure of most groups is completed. But then, how do you show the fertilization process? During the interactive discussion, some students found the infusion tube in the material, but how to operate it, so they changed from a three-person group to a six-person group, a nine-person group, etc., using the power of multiple people according to the textbook The illustrated illustration "The process of fertilization" uses a pen to draw the ovule, bead, chamber wall, etc. on the card, and also uses different paints to draw the egg cell and polar nucleus, and then uses the infusion tube as the pollen tube. The sperm produced is tied with a thin thread and put into the infusion tube, so that the fertilization process of the peach blossom can be dynamically displayed. After the group production is completed, each group representative is invited to show their results on the stage and introduce the structure of the flower and the fertilization process in the order from top to bottom and from outside to inside.

"Doing" activities carry a sense of mystery and challenge, and it is easier to stimulate students' enthusiasm for "doing", allowing students to gain new knowledge through observation and thinking in hands-on practice.

3.3. Guide Discovery and Give Opportunities to "Think"

"Learning without thinking means nothing." Learning and thinking are inseparable. Learning can acquire knowledge and skills, and thinking can undoubtedly expand and extend the thickness of knowledge. Learning without thinking, doing without thinking is a common problem in contemporary education. In classroom teaching, many teachers believe that as long as the knowledge of each lesson is filled in the minds of students, it is the ultimate goal. The existence of this phenomenon can't help but cause us to think deeply: Why do we pay more attention to knowledge rather than students' "thinking"? This is because we are educating a large number of people, just like mass production in a factory. Therefore, in order to change this situation, in the education model of "learning by doing", not only "learning by doing" must be achieved, but also "thinking by doing". Teachers use organizational design to appropriately conduct students' activities and behaviors. Guide, let them think positively, and discover problems, find patterns, and gain true knowledge from them.

Take the lesson of "Birds" as an example. First, use a song "I am a little bird" to introduce new knowledge. Many students have experience in making paper airplanes and dreams of flying freely like birds. . Therefore, in the classroom, the author makes full use of this life experience of the students to carry out the "paper airplane" production activities. Students work in groups to design themselves and try to make a paper airplane with better flight performance. At the beginning, many students designed some simple paper airplanes based on their own memory and experience, but only a few people can succeed, and no one will go. Think about why this is. So, lead the students to think: What is the reason why the paper airplane can fly in the air? What are the factors that affect the flight of paper airplanes? What problems need to be solved if we want our paper airplanes to fly? Due to the lack of student experience, in order to help students solve these doubts, the author did not directly give the answer. Instead, I will take the flight of pigeons as an example to discuss the structural characteristics of bird flight. First, I will play a video for students to fly to birds. Characteristic observation. Students think that the flight of pigeons may be affected by gravity, air resistance and wing power. Is the answer correct? Is it related to one of the elements? Are they all related?

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4. Conclusion

Driven by the problem, the student group can independently choose one or two of the elements to conduct independent research according to their actual abilities. First guide students to read the content of the text, let students think, discuss, analyze and summarize: pigeons are lighter because of their short rectum and lighter bones, so they can overcome the effect of gravity and fly lightly; because the pigeons are covered with feathers , And the body is "streamlined", so it can reduce the resistance to the air; pigeons have developed airbags and chest muscles, and when the wings are fanned, the plumes overlap each other, which can generate lift and thrust, thereby generating power. On the basis of understanding the flying principle of pigeons, students will use paper airplanes to study the flight of pigeons. By thinking about the same quality, different forms; the same form, different quality; and the production of airplanes with different throwing strengths, the design is thus designed The aircraft can naturally achieve the best performance. Finally, a class presentation is carried out to allow students to recall and reflect on their own problems and unresolved problems in the process of making airplanes. They can propose to the class to discuss and solve collectively, which will help students better grasp the life characteristics of bird flight. I also learned how to make paper airplanes. This not only breaks the constraints inside and outside the class, but also allows students to learn while doing, think actively while doing, try to solve problems, and acquire new knowledge and scientific inquiry abilities. In the teaching of this lesson, the author is acting as a "tutor", whose main responsibility is to guide students to think in their studies, and to give appropriate help and advice so that they can solve problems smoothly, thus in a relaxed and happy atmosphere. Mastering knowledge in Chinese is also the core concept of "learning by doing, thinking by learning".

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