

# The Application of Micro-course in High School Biology

## -- Taking Photosynthesis Course as an Example

Yating Luo

School of Information Technology Engineering, Tianjin University of Technology and Education, Tianjin 300222, China

1344543487@qq.com

### Abstract

The development of Internet technology and computer technology in today's world is changing with each passing day. More and more mature technology brings us more and more convenience, and it also changes our daily life. In the past, the traditional teaching methods were relatively simple, and the main method was the teaching of school teachers, which could no longer meet the requirements of the current era for informatization. In fact, people have already started to use the Internet for learning. This paper applies Micro-lectures to the curriculum of biological photosynthesis in high school, which can not only stimulate students' interest in learning, but also improve the quality and efficiency of teaching, and finally achieve the reform and development of education.

### Keywords

Internet; Micro-lecture; Photosynthesis; Instructional Design.

## 1. Introduction

As a teaching method that has become popular in the world today, Micro-lectures can have many kinds of learning methods. Many teaching methods based on traditional teaching methods, such as fragmented learning, flipped learning, and mobile learning, can be implemented through Micro-lectures. Characterized by being short and powerful, Micro-lectures are based on a certain knowledge point, and then design and produce a teaching form with micro-streaming media teaching videos as the main method. The standards on which Micro-lectures are based are classroom teaching practices and new curriculum standards. They can attract students' attention through vivid teaching videos or animations. They can allow teachers to emphasize a certain knowledge point, and through vivid animation interpretation in the video, let students learn Quickly understand knowledge points. The so-called micro-course is the abbreviation of the micro-network course. In addition to the content contained in the courseware, there should also be matching teaching activities, so that the course content and the practical links can be integrated. Organization of the Text

## 2. Feasibility Analysis of the Application of Micro-lectures in High School Biology

### 2.1. The Necessity of Applying Micro-course in Photosynthesis Course

#### 2.1.1. Teaching Analysis

The textbook is selected from the standard experimental textbook of ordinary high school curriculum, Biology 1 "Molecules and Cells". The reason for choosing this textbook is that it is the first biology lesson in high school, which can lay a solid foundation for the subsequent study.

At the same time, using the current relatively novel Micro-lecture production software, the abstract concepts in the textbooks are transformed into visual picture demonstrations. Help teachers and students to teach and learn conveniently, and provide a new learning resource for students to learn such knowledge points. Students have the most basic knowledge of photosynthesis in junior high school, but they do not have a deep understanding of the overall process, and they are not familiar with the specific operations of extraction and separation of pigments in green leaves.

Teaching key points and teaching difficulties, the teaching focus of this class is on the whole process of photosynthesis, as well as the separate processes of light reaction and dark reaction. These will run through the entire high school biology and have a very important place.

The teaching difficulty of this class is how to extract the pigment in green leaves and how the light reaction and the dark reaction are transformed into each other.

## 2.2. Necessity Analysis

Photosynthesis occupies a very important position in the study of high school biology and is an indispensable part of knowledge. Photosynthesis, as the name suggests, is a biochemical process, which is required by almost all biological communities, and is also widely used in our daily life: in agricultural research, photosynthesis is the basis of many aspects of research, and it is impossible or impossible. Short. Understanding light and dark reactions can facilitate the formation of greenhouses, speed up air circulation, increase crop yields, and avoid risks. These measures include: reasonable density of plantations, three-dimensional economic crops, appropriate increase of carbon dioxide concentration, appropriate increase of lighting time, reduction of the protection of atmospheric electric fields and creation of space electric fields.

The course of photosynthesis is explained in the form of Micro-lectures, which can dynamically show the process of photosynthesis, help students better understand, and use animation to attract students' attention. Effective use of micro-teaching in the course of "Photosynthesis" can provide more innovative teaching, demonstrate the process of photosynthesis to students more intuitively, and help students understand the difficulties of teaching. As a key and difficult point, photosynthesis is the cornerstone for students to learn biology well. Only after a solid study here, can future courses be easier to learn.

## 3. Current Status of Micro-lecture Research

In recent years in my country, the development of Micro-lectures has been divided into two stages, one is reorganization and the other is innovation. Combined with traditional forms, while recording video and image data, we seek innovation on this basis. By taking the essence and removing the dross, better course resources can be obtained, and the previous wonderful courses can be recombined and upgraded into micro-courses with concise and to-the-point characteristics. From another point of view, it is not just recombination. In terms of development, blindly recombining will not be of much help, innovation is the fundamental driving force for development. Through the teachers of the school constantly exerting their imagination, and then using the Micro-lecture skills they have mastered to make Micro-lectures, the quality of Micro-lectures has been improved day by day. Afterwards, it must be reviewed by experts, and the approved works can be uploaded to public resources such as the Internet, and the public can also watch it, which is more conducive to the dissemination and development of Micro-lectures [1]

The form of teaching has been changing from ancient times to the present. The ancient Confucian way of Mencius created Confucianism, and until now, the teaching method has undergone great changes, and many new teaching methods have been born one after another. Of course, Micro-lectures play an important role in many derived teaching methods, which can

not only bring more interesting classes to students, but also make it easier to understand the important knowledge of classes. The full use of Micro-lectures in the process of concept teaching, typical examples, review and consolidation can effectively promote the improvement of teaching quality and deepen the impression of students. However, in the production of Micro-lectures, teachers still need to continuously integrate innovative ideas and methods. [2]

## **4. The Application of Micro-course in Photosynthesis Course**

### **4.1. Analysis of the Teaching Objectives of Micro-lectures**

The teaching objectives of this class are divided into knowledge objectives, ability objectives, emotional attitudes and values objectives. The knowledge goal is that students can clearly know the process of photosynthesis, the conditions for photosynthesis, and the mutual conversion of light reaction and dark reaction. The ability goal is to cultivate students' ability to think independently and solve problems. Think about the content of the experiment, and students who have the conditions can experiment by themselves. The goal of emotional attitude values is to let students understand the importance of photosynthesis, let students realize that they should not destroy nature, and respect the ecological laws of each creature.

### **4.2. Micro Course Teaching Design**

The first part: situation introduction, lead to concept. In the stage of situation introduction, a summary of the courses learned in the previous period was given, and an example of the difference between albino maize seedlings and green seedlings in the growth stage was given, so that students had a basic understanding of photosynthetic pigments. At the same time, it lays the groundwork for the following experimental content.

The second part: a preliminary introduction to the teaching focus. After doing the foreshadowing in the front, the first difficult point of this class is introduced, which is an experiment of extraction and separation of pigments. Using the most intuitive animation demonstration method, this experiment is fully displayed. The highlight is to put the Some important details are optimized to make it easier for students to understand.

The third part: progressively, continue to deepen. After the experiment, you can start the explanation of the follow-up courses, first introduce the site of photosynthesis and the internal structure of the chloroplast to help students deepen their memory. Immediately afterwards, the respective explanations of the light reaction and the dark reaction process can be carried out, and their mutual conversion can be emphasized.

The fourth part: improve the curriculum and make a conclusion. Help students make a systematic summary of what they have learned. Helping students to clarify their thinking is also the last step of the micro-class, and there is a conclusion to the knowledge points learned in this class.

### **4.3. Components of Micro-lessons**

The Micro-lecture consists of four parts. The first part is the introduction stage. In the introduction stage, students can have a preliminary understanding and understanding of the knowledge points to be learned in this class, and also lay a foreshadowing and foundation first. Provide students with a basic understanding of photosynthetic pigments. At the same time, it lays the groundwork for the following experimental content.

The second part is an experiment on the extraction and separation of pigments. Using the most intuitive animation demonstration method, the experiment is completely displayed, and the students are more intuitively guided to realize the importance of pigments for photosynthesis. With the help of the experimental link, students can have a deeper understanding of photosynthesis, as if participating in a certain process, as if they were there. After the

experiment, I made a summary of the pigments distributed in the green leaves, echoing the beginning and the end, with a complete structure, and showed it to the students by writing on the blackboard, which satisfies the rigor, scientificity and rationality of the experiment.

The main content of the third part is to introduce the location and place of photosynthesis. Here, the intuitive reaction process is directly demonstrated. At the same time, the internal analysis method is used to help students understand the essence of chloroplast more intuitively, that is, the main part of photosynthesis. place. It is meticulous to every small structure in the chloroplast, laying a foundation and paving the way for students to learn the next process of photosynthesis.

The fourth part mainly introduces the light reaction and the dark reaction, and elaborates the relationship between the two and their processes can be converted into each other. The content here is cumbersome in traditional textbooks. Here, the specific process can be refined. The process of expressing the light reaction and the dark reaction more vividly makes the students remember it fresh. The light reaction and the dark reaction are shown in detail. After the interaction, an in-depth summary of the changes produced by the reaction is carried out, and the knowledge points are sorted out to help memory.

## 5. Conclusion

Micro-lectures are designed from the perspective of students. Based on the perspective of students, teachers can make the theme prominent in the production process, and the content is short and important, so that students can absorb it in a short time. At the same time, it is also necessary to pay attention to the coherence of content and the progressiveness of knowledge in the production process. The content is from simple to difficult and the language is fluent, so as to promote a vivid and exciting class. The subject introduces photosynthesis, which is the basis of our biology course, and is essentially a biochemical reaction process. When designing the courseware, analyzing the actual problems and increasing the proportion of practical links, such as adding chlorophyll extraction experiments to the subject, can make the students deeply impressed after class, and also improve the fun of learning. The addition of the experiment enables the students to understand the operation process and can be proficient in the experiment. With the improvement of students' aesthetics and the advancement of scientific and technological means, Micro-lectures will also develop in a better direction, and will incorporate more elements of science and technology. In the future, viewing and practical interactive teaching can be increased. If you follow the "checklist" your paper will conform to the requirements of the publisher and facilitate a problem-free publication process.

## References

- [1] Li Chengfang. Research on high school biology micro-course teaching under the background of "Internet +" [J]. Famous Teacher Online,2020(12):11-12.
- [2] Cai Bohan, Feng Jianwen. Research on the teaching strategy of Micro-lecture making course under the core literacy [J]. Computer Knowledge and Technology,2020,16(10):76-78.
- [3] Wang Yongqiang. The dilemma and improvement methods of high school biology experiment teaching under the new curriculum reform [J]. Science Weekly,2020(16):25-26.
- [4] Hou Jing. Exploration on Teaching Reform of "Introduction to Biotechnology" Course [J]. Chinese Journal of Multimedia and Network Teaching (Early Issue),2020(06):171-172.
- [5] Zhang Chao. Infiltrating the view of matter and energy and the education of scientific thinking in the teaching of "photosynthesis" [J]. Bulletin of Biology, 2019,54(07):29-31.
- [6] Zhu Qinshi. The mechanism and origin of photoreaction in photosynthesis (6) [J]. Bulletin of Biology, 2019,54(07):5-8.