Preliminary Attempt to Reform the Teaching Method of Zoological Experiment Course

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[Abstract] This article probes into the weakness shown in zoological experiment learning of biology department students and explores method in zoological experiment teaching in order to adapt biology teaching in middle schools.
[Keywords] Zoological experiment; Teaching method

1. Introduction

The teaching goal of the biology education major of the Department of Biology is to train qualified middle school biology teachers. The current middle school zoology teaching is mainly experiment, which involves the identification and structural observation of many representative animals. This requires teachers not only have a high theoretical knowledge of zoology, but also a strong ability to analyze and solve practical problems; strong hands-on ability and ability to identify and identify specimens. As an important supplement to the zoology theory class, the zoology experiment course plays an important role in consolidating the theoretical knowledge of students' animals, cultivating practical hands-on ability and analyzing and solving practical problems.[1]

2. Problems Reflected in Teaching

Through the follow-up survey of the teaching situation of our graduates and the field internships and educational internships of students, the students' deficiencies in analyzing and solving practical problems are more prominent, mainly reflected in the following aspects:

2.1 Poor Ability to Recognize Specimens

Some of the common animals encountered in teaching activities cannot accurately point out their subjects, families, genera or species names. This is a place often asked by middle school students and is a common embarrassment encountered by middle school biology teachers.

2.2 Poor Ability to Identify Specimens

Students often make false identifications of animal specimens, and even some students simply do not know how to proceed to search.

2.3 Poor Ability to Dissect and Analyze Animals.

In particular, animals that have not been dissected in the experimental class cannot find scientific anatomical methods and master their structures.

For the first question, our department started to educate students in classroom teaching and field internships since 1998. (That is, students must be able to identify 300-400 animals and plants and develop a series of assessment measures in three years of study). From the perspective of the effect, the ability of students to identify common animals and plants has been greatly improved. However, the ability to identify specimens that are uncommon or unrecognizable and the ability to analyze actual problems remains unresolved.

3. Cause Analysis

(1) The teaching process is biased towards theoretical teaching. The proportion of the results of the experimental class in the total score is too small, so it fails to attract enough attention from the students.

(2) Students generally have poor foundations, lack of initiative in learning initiative, do not like brain analysis problems, and long-term development of "passive acceptance, rote memorization" learning methods.

(3) The experimental teaching equipment is backward, and the number of students in the experimental group is large. It is difficult for the teacher to ensure that the students can master every knowledge point when conducting counseling and explanation. For example, in the microscopic observation of tiny animals, due to the lack of equipment such as microscopes and teaching microscopes, teachers can only explain and observe the contents on the blackboard or on the wall chart. Then, some students who ask questions are explained one by one under the microscope. The structure on the blackboard or on the flip chart is only a theoretical structure, which is quite different from the actual structure under the microscope. It is difficult for students to understand this difference.

(4) Animal experiment classes have many shortcomings in teaching organization methods. Ignore the cultivation of students' analytical ability and adopt the "infusion" teaching method. For example, the "anatomy of the domestic pigeon" is taught. The teacher first repeats the theoretical structure and anatomy of the domestic pigeon, and then tells the physical structure of the pigeon by table. This teaching method can basically grasp the structure of the domestic pigeons for the students who listen carefully, but when they encounter animals that have not been dissected in their work, they will feel that they are "unable to get started and difficult to master". For example, in the classification experiment of a certain type of animal, the teacher firstly guides the students to review the classification of such animals, and then explains the

identification characteristics of the specimens, and then allows the students to identify the specimens with "death". This kind of teaching method also has the problem of timeliness of memory for serious students, and the learning effect of students with poor self-consciousness is even more imaginable.

(5) In terms of animal classification, the requirements of the textbook for students are limited to the characteristics of the subject and subject. The textbook mainly introduces the animal groups in the northern region, and the students will face a large number of animal groups in the southwest. Students lack information on animal identification in this region.

4. Attempt to Reform Teaching Methods in Zoological Experiment Course

Try to reform from the following aspects according to different experimental contents:

(1) Change "First Lecture, Then Experiment" to "First Experiment, Then Lecture"

In the animal classification experiment teaching, make the breakthrough textbook only requires the classification of animals into categories or families and the representation of animals only for the limitations of the northern region. Some animal groups are required to be classified into genus or species and the representative animals are mainly concentrated in common species or characteristic species in the region. In the teaching, the teacher in the past introduces the animal name and characteristics one by one and then asks the students to carry out the method of "remembering and memorizing", and let the students identify and master the characteristics. For example, for the "Classification of Amphibians and Reptiles" experimental class, the pre-class editing "Australian amphibians and reptiles search" is used to make students a handbook containing dozens of amphibians and reptiles.

The teaching of animal anatomy experiments changed the teaching method that only focused on letting students master the anatomy of animals, and focused on cultivating students' practical skills and ability to analyze and solve problems. For example, in the anatomical experiment of toad, the teacher first guides the students to review the theoretical structure of the amphibians and explain their anatomical methods and discuss with the students why such anatomy and anatomy need to pay attention to. List the structures that require the students to actually identify and master the structure, allowing the students to dissect themselves and identify their structure. Then the teacher asks questions one by one and evaluates the quality of the anatomy. Finally, it sums up the anatomical similarities and differences between toad and other amphibians.

Try to use the "conversational" and "discussion" teaching methods in the lectures, that is, to reduce the lengthy lectures and chat with students around the teaching content. In this relaxed classroom atmosphere, students' attention will be naturally concentrated, and they will ask questions or provide their own opinions based on their knowledge of the knowledge, and the teachers will guide and analyze them.

(2) Change "Drawing Work" to "Self-made Material Object + Q&A -Based Homework"

For a long time, the homework of animal experiments has been drawn in the form of an anatomical structure. Although this method helps to train students' bio-graphing ability, it has certain drawbacks. For example, the pictures made by students do not truly reflect the mastery and understanding of the structure, and the homework will occupy a lot of time in the experimental class. It is difficult for students to have enough time to think, understand or remember. It is often the case that individual students fail to complete the experiment as required to copy the textbooks or the same schoolwork, so that the experimental results are discounted. According to the experimental content, different work forms such as physical work, on-site Q&A, observation report, and after-school questions are taken, which is conducive to objectively and impartially evaluating students' knowledge of the situation, and is conducive to eliminating the above drawbacks, especially to avoid the phenomenon that students who are unconscious are "nothing to do" in the experimental class.

For example, in the experiment of "Affiliation of Arthropods (M. prawn)", we take the form of physical work and on-site question and answer. Have each student prepare a set of specimens for the appendages of the giant prawn. It is also required to indicate the name of each appendage, the appendages of each part, the limb type, and the appendages that constitute the mouthparts. Each student answers three related questions and records them when they submit homework. Finally, the quality of the specimens, the scientificity of the annotations, and the accuracy of the answers are used as the criteria for the assessment of the performance.

(3) Change the Examination Method from "Collective Written Test" to "Single Actual Operation + Answering Questions"

Experimental examinations, such as the use of written examinations, have duplicates in the content and theoretical examinations, and are not conducive to students' emphasis on practical hands-on ability, and are not conducive to a comprehensive examination of students' knowledge and abilities.

We use a combination of theory and practice to test the students one by one. The specific approach is:

1) Take all the animal experiments (usually 10-13) in this semester as the test content, and let the students select one before the exam as the specific test content.

2) Provide the students with the experimental materials corresponding to the content, and then choose the tools or instruments themselves, and require the anatomy or production and observation to be completed within a limited time.

3) Give a comprehensive score (40% of the total score of the lab test) according to the steps of the student's operation, the level of anatomy, etc.

4) Ask six questions for the students to answer, and according to the situation of the answer and the difficulty of adjusting the B-inch problem, finally evaluate the answer to the question (accounting for 60% of the total score of the experimental test).

5. Conclusion

From the situation of educational internships and field internships, students' anatomical ability and specimen recognition ability have been improved. In addition, through an anonymous questionnaire survey of 70 students in two classes, 91.4% of the students surveyed felt that the animal experiment class was very helpful for animal theory learning; 7.1% felt that they were generally helpful; 67.1% were satisfied with the teaching methods of the animal experiment class; 32.9% felt average. It shows that the new animal experiment teaching method has achieved good results, and its success has the following points:

(1) The teaching content of the experimental class is closely integrated with the teaching content of the middle school biology, so that students feel that they have applied what they have learned.

(2) Pay attention to the cultivation of students' practical ability analysis and problem-solving ability. Make students draw inferences about other cases from one instance.

(3) It solves the problem of students' poor self-consciousness, so that students can't be lazy in all aspects of teaching.

(4) Pay attention to creating a good and relaxed learning atmosphere in teaching, and improve students' interest in learning.

References

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